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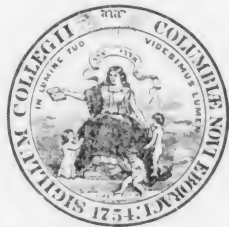
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AN ESSAY
ON
LOGICAL METHOD.

BY
CHARLES P. CHRETIEN, M.A.
FELLOW AND TUTOR OF ORIEL COLLEGE.

OXFORD,
JOHN HENRY PARKER;
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TO THOSE
FROM WHOM THE AUTHOR HAS LEARNED MUCH
WHEN HE SEEMED TO BE
TEACHING

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PREFACE.

IN the following pages I have endeavoured to consult principally the wants of those, whose taste for Logic has carried them beyond its simpler technicalities. Such persons will naturally desire to learn how it may be useful in practice. Having studied the nature of its machinery, they will gladly see it in operation.

It is almost beyond my hope that what I have written may also be of service to some, whose distaste for Logic amounts to a prejudice. Ordinary reasoning can scarcely remove the irrational opinion, that the legitimate study of the way to knowledge acts mainly as an encouragement to ignorance.

That the few examples I have employed are intentionally popular, will hardly be considered a defect by those who know how apt an abstruse illustration is to rival, if not to surpass, its subject in obscurity.

The very simple division of Sciences which I have adopted will excite a smile in some who have approached the same subject from another quarter. But it is perfectly defensible, if the principles of this work be in other respects true. Without being the best or the only scheme, it may yet be valid and Logical.

To confess myself conscious of many faults in this Essay, is a poor apology for leaving them uncorrected. They would have been more numerous, but for a reason which I have great pleasure in being permitted to mention. Both the Essay and its Author are under more obligations than can be particularised, to his dear friends and brother-fellows, the Reverend GEORGE BUCKLE, and Mr. JOHN WILLIAM BURGON.

Oriel,
June 17, 1848.

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INTRODUCTION.

THE student of Logic, who takes in hand any of the old compendia which still survive in partial use among us, will observe, that, towards their conclusion, they all engage upon one common subject, which is, as they differently phrase it, Method, or the use of Logic. To this, all that has preceded is meant to minister. It implies the earlier parts of Logic, as a building implies the foundation. Its existence assumes that Apprehension, and Judgment, and Discourse, have made some considerable progress, and accumulated a sufficient body of knowledge to require methodical disposition. Thus syllogism is considered as the unit, or, so to speak, the atom of reasoning; and with its combinations method is concerned. To stop short at the consideration of this most concise and simple form of argument, without dwelling on its methodical arrangement, would be to neglect that application of it, which mainly renders it worth consideration at all.

Yet to this part of the subject incipient logicians still want a guide. The able treatise of Archbishop Whately terminates, for this purpose, just too early. He teaches the recruits how each dialectical

weapon may be wielded to advantage; not how the whole armoury may be employed in concert with good effect.

And without any disparagement to later labourers in this field, it may be said, that such other guides to the knowledge of method as are not palpably superficial, start from first premises too unlike those which we semi-scholastics of Oxford still retain to be naturally adopted as instructors in our school. Instead of extending the old line of enquiry, they turn to one which is altogether new, and, where we are expecting explanation, give us contrast. Or their turn is physical rather than logical: they insist more on the facts which method embodies, than on the formal process of their embodiment.

It would be wide of our purpose to discuss any schemes of method, which are built on other than a logical groundwork. However true and excellent they may be, Logic is not the porch through which to approach them. And yet it is most unlikely that no entrance lies to method through this vestibule. When we owe to the schoolmen and their successors so much of our scientific phraseology, so many of the terms which hang loose between exact and popular usage, and serve to bridge over (for good or for evil, as the causeway so formed is employed) the gap which separates sciolism and science; when we take so commonly as our material the fragments of their mosaic-work,

it seems unnatural and unwise, not to say ungrateful, to pay no attention to the plan according to which they arranged them. Doubtless they were fitted for their original use; and we may learn much from considering the nature of this use, although we may not think proper to adopt it.

Possibly, then, the domain of logical speculation is not so fully occupied, as to leave no room for the following Essay. Our object is, to view Logic at once by the light of the past and the present; to enquire, in the first place, what ideas respecting its nature were formerly entertained, and what questions originated from their adoption: how one race of thinkers profited both by the knowledge and the mistakes of those preceding them, and handed down the results of their labours to their successors, not without a still abiding mixture of error;—and, this done, to show, how truths advancing from different quarters meet at last, and unite peaceably, where we might have feared a collision; how, as Logic has always of her own free will testified to the truth of Science, Science in her turn bears unintentional but not involuntary witness to the truth and utility of Logic.

The former part of this Essay, therefore, is mainly historical; the latter regards rather the present state of knowledge, and aims at illustrating the close connection between logical and scientific method. The general fact of their connection one consideration alone would serve to establish.

It cannot be by a mere accidental coincidence that Logic and Science both point to a deductive system as the perfect type of method. This they do on grounds perfectly distinct. The logician asserts the supremacy of Deduction, because it exhibits most naturally the powers of his favourite instrument, the syllogism; because it assigns with the greatest definiteness and precision to the proposition and the term their respective places and importance. The man of science also takes Deduction as the type of excellence, because he finds that, as matter of fact, the deductive sciences are the most perfect. It would not at first strike the logician that Mathematics exhibited the full power of the syllogism, or the mathematician, that his pursuits illustrated the chief exercise of Logic. But a little thought shows either party that there is a real conformity, not only in the results, but in the process by which they attain them. Each is attracted by the same feature in a deductive system, that is, as we shall see hereafter, the perfect manner in which it unites in itself subordination and consequentiality.

Where then there is on the whole such general agreement, we should expect to find it pervading the details also. Here, however, it does not at first appear. Science says little of universals and particulars, of distribution and non-distribution, of judgment and discourse. While on the peculiar features and arrangements of each particular

science Logic is of course equally silent. But, on reflection, another class of terms occur, which Logic and Science use in common. Such are, conception and idea, genus and species, analysis and synthesis. The vague use of words like these is an evil which we ought not unnecessarily to tolerate. Metaphorical in some sense they must be; but the nature and extent of the metaphor deserves to be considered. And the further question naturally arises, not only from what they have been transferred, but to whom. Their use indifferently by logicians and men of science suggests the supposition, that Science has taken them improperly from Logic, or Logic from Science. But it is satisfactory to discover, that some knowledge of the nature of method renders either hypothesis unnecessary; that it is with regard to method that the terms have gained their meaning, and preserving that meaning, are derived, with equal propriety, to Science on the one hand, and Logic on the other.

The idea of method, indeed, is prior to that of either Science or Logic. It is simpler, where they are more complex. It enters into every thing which admits of arrangement and order. There is method in placing in a row a number of mineralogical specimens according to their external resemblance: though this is not a science. There is method in grouping together a number of aphorisms, or proverbs, or practical maxims, which refer

to the same subject: though this falls short of Logic. There may be order, and therefore method, where there is little knowledge and no consequentiality. Crabbe, with his usual truth and usual bitterness, has observed of misers, heralds, flower-fanciers, and one or two other respectable rather than useful classes of men, that,

Order to these is armour and defence,
And love of method serves in lack of sense*.

To be methodical, is useful both to the professor of knowledge, and to him who would acquire it; but it is perfectly compatible both with ignorance in the one, and apathy in the other.

Before, then, entering directly on our subject, a few words may be said both on the use and abuse of methodology. Some degree of method is necessary in every stage above the merest empiricism. Without it, we could only observe detached facts; we could not couple them by any mental association, unite them indissolubly, and extract a principle from them. We use an inartificial method in the ordinary process of gaining knowledge by observation, and retaining it. As this process becomes more elaborate, we require a more elaborate apparatus for our aid. Our system must expand together with that which we systematize.

But this, it may be said, proves only the importance of method, not of studying it. An

* "The Learned Boy."

eminent naturalist once insisted on the utility of Chemistry, because sulphur, for instance, was a constituent substance of the body, and Chemistry taught the nature and properties of sulphur. The answer was obvious;—that however important the element might be, it was not therefore of equal importance to be aware of its existence. Though the sulphur was useful, it did not follow that the knowledge of its utility was useful knowledge. In like manner it may be argued: method is indispensable; but not therefore the study of method.

And further, it is a common remark, that ordinary systems of procedure are despised by those minds which bear the impress of genius. They travel a way of their own; and "their justification lies in their success." If they exhibit the perfection of method, it is unconsciously. Conformity to rule would only have cramped them. Their greatness depended on their perfect freedom from restraint.

Allowing this to be true, which it is not in the sense in which it is often taken, the study of method may yet be abundantly useful. Granting that it is not of service to the greatest of men, it will quite suffice if it profits all below them. The result of their spontaneous and almost unconscious energies we must be content to attain by the aid of rule. Others on system aim at that which they attain unsystematically. Their very superiority

makes their instinct, our model. With the earnest-minded, to admire, is to imitate. And surely it is better to attain the height of excellence which we admire, though by a different road, than, in a vain mimicry of the process, to fail of the result altogether.

The study of method then has its use: it is also liable to abuse. Its office is, to enable us to arrange and combine facts, not to enable us to dispense with them. Yet it may be, and has been, thus perverted. If knowledge, and observation, and experiment, are observed to go further with method than without them, men may fall into the misconception, that it can supersede them to so great a degree, as to render them comparatively unimportant. When possessed with this idea, they endeavour to employ *form* as the staple of their enquiries, to the neglect of matter. Such, it will be presently seen, was the great error of the schoolmen. They saw a possibility, which they vainly endeavoured to realize. It may be possible, that, from the perfect analysis of a truth, all other truths may be inferred: it is highly impossible that any one will ever be able to perfect the analysis, and effect the inference.

But it would be premature to dwell at present on the scholastic abuse of method. It will be more to our purpose to mention some of its evil results in a form with which we are more familiar. For in an undue exaltation of methodology lies

the intellectual error of those, with whom speculation and "agitation of wit" stand in the place of learning; who are content with nothing short of system, and desire nothing more; who make consistency the one test of truth, or, if they avoid the mistake of confounding what is with what might have been, neglect the actual in the vain quest of the ideal; who devote themselves, in short, to "that idle and not very innocent employment of forming" in philosophy, and religion, and civil government, "imaginary models of a world, and schemes of governing it."

There is, then, great danger in the *exclusive* study of method. The mere collector of facts, which he cannot arrange, and has no real notion of using, cannot do much harm to himself or others. If his labours are on a great scale, he becomes a helot of literature, toiling that others may enjoy. In a smaller field, he terminates, for the most part, as a dealer in ill-sorted anecdotes and ill-digested propositions; while, in matters of importance, he follows passively in the wake of others, who govern him by the possession of a little more tact and judgment. He has knowledge, in some sense, without information.

But he who, unprovided with facts, and without the intention of acquiring them, enters on the study of methodology, has no such immunity from danger. From a small foundation he hopes to proceed to great and extensive knowledge. Re-

search is not his occupation, but the exercise of his ingenuity. On some few first principles, which recommend themselves to his own mind, or are taken on trust from those whom he admires, or, it may be, have real external evidence in their favour, he fastens his belief. But these lie far apart from this common-life world and the domain of ordinary practice. For the connection between them he depends on certain slender intellectual threads, spun out, spider-like, from within. That which he thus invents, he believes: but this belief rests, not on objective truth, or on the evidence of his fellow-creatures, or on God, but on himself. Unbelief sits at the right hand of such a faith. A self-made Damocles, he sees the sword of scepticism suspended over him by a hair. If events do not fall out as he expects, if phenomena will not harmonize with his system, if truth in some painful and oppressive form thrusts itself upon him, he becomes convinced, though against his will, that things are not as they seemed to him. He deserts his system; and what has he left? Nothing but the ruins of a building which had no foundation, the material of those thin walls built upon the sand which one blast of God's breath could overthrow. Mere love of method is self-worship, and nothing more. The overthrow of the idol is the best fate which we can wish to the idolater.

The true student of method is in an entirely different intellectual position. He will labour

to preserve the analogy of truth—to keep the world within in harmony with the world without. Method itself will not be his ultimate object, but some other branch of enquiry, to which he applies his method, and which it is meant to further.

Those who have really forwarded formal science have been men of general science also. Plato, that greatest of merely human names, was no unpractical dreamer on abstractions, but did every thing well that he attempted, from writing Greek to wrestling. Aristotle was the most learned of men. The best of the schoolmen were familiar with Courts, and toiled in Councils, while they methodized. Lord Bacon had an eye for facts of almost preternatural acuteness. Descartes not only wrote *de methodo*, and wandered at large in metaphysics, but was a mathematician, an anatomist, and almost, in his way, a divine.

The dry metaphysician is the most useless of all beings; he handles truths of which he does not know the preciousness. When he has once mapped out the country, he would be unconcerned if it should sink under water. "A reasoning self-sufficing thing," he suffices for nothing but himself. He is the usurer of intellect, and the miser.

Method is, as the name indicates, a way in quest of something. It is intended to forward research, not to be itself an object. He is sure to fall short of his mark, who erects a means into an end.

Let us now proceed, before insisting on the true relation of Logic to Science, to consider the views which have been previously entertained on the subject; and to show how the thinkers of ancient and mediæval times handed on the torch to their successors.

CHAP. I.

THE ANCIENT VIEW OF THE RELATION OF LOGIC TO SCIENCE.

IN considering the relation which, according to the ancient and mediæval philosophies respectively, Logic bore to Science, it would be unwise to take any very restricted notion of Logic itself, by which to limit our enquiries, and test the opinions of those who have preceded us. We must not look for greater accuracy in the use of our terms than was possible in the time of their early application. We shall see more fully the bearings of our subject, by taking Logic in its widest sense; not enforcing our distinctions on those who could never have heard of them, but content, as is often best at the opening of an investigation, to follow the guidance of a name, and see whither it will lead us. So we may be sure, that wherever we find the word Logic, we are on our proper ground, in whatever sense our authorities used it; whether they meant by it an art or a science, whether they assigned to it as its province, language, or inference, or thought in general.

And if, as can scarcely be doubted, Logic is to

be considered rather an art than a science, this alone would justify us in using the term somewhat vaguely. Science is, as we shall hereafter see, the development of an idea; and the definiteness of this idea is a condition of the progress of the science. Not so with art, which deals rather with phenomena than with ideas, which aims at effecting an end, not at exploring a certain sphere of knowledge. Arts contract and expand almost indefinitely. The bold projector widens their field in theory, the skilful artificer enlarges them in practice. On the other hand, the division of labour often splits one art into several, and limits to a part the application of a name which once extended to the whole; or the advance of knowledge shows perhaps that it has attempted more than it could well fulfil, and leads it to modify its pretensions; or some change in the circumstances of social life causes it to fall into neglect and desuetude. So that the history of an art, like that of a kingdom, is to a great extent the history of its boundaries. The capital remains unchanged, but the extent of territory around it varies. We all know what is meant by the art of Medicine; yet how little remains fixed in it when examined. At first we have a scanty knowledge of simples, and some empirical rules as to diet. Then the mineral kingdom comes in to lend its aid to the vegetable. Afterwards we find the art taking another turn, and, not content with bare observation, deducing

rules from guesses as to the nature of remedies in general, some fanciful doctrine of signatures, for instance, or a premature theory of vital action. Then a better acquaintance with the laws of Physiology and Chemistry comes to its aid. We must not forget its shifting and uncertain sympathies with other real or pretended systems—with Alchemy, or Astrology, or Magnetism. Yet how small a part of this array of subjects comes under the notice of the ordinary practitioner! To enquire into the history of Medicine, confining ourselves to our own views of its nature and province, would lead us to rob the ancients without enriching the moderns, and make one of the oldest of the arts comparatively a creature of the day.

What place then did Logic, taken in its broadest sense, occupy in the systems of the philosophers of Greece?

Philosophy was in existence some time, before Logic arose by her side. The Ionian and Pythagorean Schools had no Logic. It is not hard to see the reason of this. The two Schools have this point of resemblance, that the teaching of each was *homogeneous*. They attempted no division of Philosophy. The systems of the one were based wholly on physical considerations, of the other wholly on metaphysical. And they had the whole world before them: their enquiries assumed the form of curiosity; they speculated without doubt, and concluded without hesitation. Men do not

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seek a canon of truth till they feel the danger of falling into error. Thales and Pythagoras had no such misgiving; they argued and dogmatized without fear of contradiction, and were received with an applause that bore witness to their success. They were too sanguine to need a Logic.

The Eleatics, who were the first doubters, first showed symptoms of a logical turn. They witnessed the failure of the Ionian and Pythagorean systems. When Xenophanes lived and philosophized, water and chaos had each been advocated as the principle of all things. By the time of Empedocles, fire and air had each likewise aspired to universal rule, and failed. The Pythagorean theory of numbers had met with no better success. The Eleatics, only half discouraged by these repeated misadventures of others, formed a new scheme of their own. We owe to them one of the fundamental antitheses of Philosophy, that of sense and reason. Unhappily, they made this nice distinction the occasion of an error, and, in distinguishing, opposed them. They taught, not that reason and sense were conversant with the different poles of truth, but that the one was the source of truth, the other of falsehood. Thus they introduced a vicious dualism into their philosophy, in the form of an antithesis between the cognizable and the sensible, the ideal and the actual world.

These opinions of theirs introduced a new division into Philosophy. To Physic (taken in its widest

sense as including Metaphysic) they added Logic. The new feature developed itself by degrees. Empedocles had a leaning towards Dialectic, which is indicated by his inventing Rhetoric—an honour which Aristotle ascribes to him. Nor was Parmenides ignorant of this branch of thought. Zeno enjoys the distinction of being styled the inventor of Logic by Aristotle himself^a. And now Philosophy displayed clearly the two divisions of Logic and Physic.

Ethic had hitherto held quite a subordinate place. It came in as a corollary attached to other conclusions, and had no distinct principles of its own. The ethical opinions of those old philosophers followed naturally from their physical. Thus Clemens Alexandrinus informs us, that Heraclitus, the tendency of whose whole philosophy was to annihilate the individual, very consistently made the chief good consist in content, which is the submission of the individual mind to the universal; while Pythagoras, (mathematical to the last,) placed happiness in "the knowledge of the perfection of the numbers of the soul;" and Anaxagoras, who

^a Sextus Empiricus adversus Mathematicos, b. vii. ch. 1. Ἐμπεδοκλέα μὲν γὰρ ὁ Ἀριστοτέλης φησὶ πρῶτον ῥητορικὴν κεκινήκεναι. ἥς ἀντίστροφον εἶναι τὴν διαλεκτικὴν, τούτέστιν, ἰσόστροφον, διὰ τὸ περὶ τὴν αὐτὴν ὕλην στρέφεσθαι. ὡς καὶ ἀντίθεον ὁ ποιητὴς ἔφη τὸν Ὀδυσσεά· ὅπερ ἦν, ἰσόθεον. Παρμενίδης δὲ οὐκ ἂν δόξαι τῆς διαλεκτικῆς ἀπείρως ἔχειν, ἐπεὶ περὶ πάλιν Ἀριστοτέλης τὸν γνώριμον αὐτοῦ Ζήνωνα διαλεκτικῆς ἀρχηγὸν ὑπεῖληφεν. The whole chapter, though not to be implicitly followed in all its statements, will repay an attentive perusal.

held, as his physical theory, that the primitive Chaos had been informed and shaped by intellect, found the end of life in "contemplation, and the freedom resulting therefrom".^b Detached opinions, such as these, are all we can expect to find. Scarcely a ray of moral light descends from the abstract and metaphysical theology of Xenophanes. Empedocles cannot claim the title of an ethical teacher; we must seek in his physical philosophy the reasons of such tenets as the unlawfulness of depriving animals of life. Love and Hate, so naturally principles of action, are with him the elements of a physical theory, where they are seen, not moving men, but forming a world. There was no independent ethical teaching, before the time of Socrates.

The glorious mind of Plato, so sympathetic with the thoughts of all he loved and honoured, and yet so comprehensive of all truth, while it attached all due importance to the Socratic doctrines, did not venture to neglect the labours of the past. The

^b *Stoimata*, lib. ii. p. 416. Οὐκ οὐκ ἐπὶ τούτοις ἀρκουμένοις καταπαναστέον, φιλοτιμητέον δὲ, ὡς ἐνι μάλιστα, καὶ τὰ πρὸς τῶν φυσικῶν δογματιζόμενα περὶ τοῦ προκειμένου παραθέσθαι. Ἀναξαγόραν μὲν γὰρ τὸν Κλαζομένιον τὴν θεωρίαν φάναι τοῦ βίου τέλος εἶναι, καὶ τὴν ἀπὸ ταύτης ἐλευθερίαν, λέγουσιν· Ἡράκλειτόν τε τὸν Ἐφέσιον τὴν εὐαρίστησιν. Πυθαγόραν δὲ ὁ Ποντικὸς Ἡρακλείδης ἱστορεῖ τὴν ἐπιστήμην τῆς τελειότητος τῶν ἀριθμῶν τῆς ψυχῆς εὐδαιμονίαν εἶναι παραδεδοκέναι, κ. τ. λ. I have ventured, it will be seen, to introduce in the text, ἀριθμῶν for ἀρετῶν, the conjectural reading of Potter, who quotes Theodoret to the same effect. Ὁ δὲ πολυθρύλλητος Πυθαγόρας τὴν τελειοτάτην τῶν ἀριθμῶν ἐπιστήμην ἔσχατον ὑπελάμβανεν ἀγαθόν.

Ethic of Socrates was retained by him, but not in its isolation. Endeavouring to transfer to his master the praise which was justly his own, he put him forward as the discoverer of the triple aspect of Philosophy^c. And Socrates undoubtedly had considerable pretensions as a logician; his view of method, so far as we can trace it, was admirable; and he so systematized definition and induction, as to have been deemed their inventor^d. But his occasional speculations on the nature of the world and the soul will not entitle him to the name of a physical philosopher. Nor, granting their fullest value to his researches, can we therefore fairly assume his acquaintance with the scheme which under his pupil's hands they illustrated. It is to the systematic Plato that we really owe the division of Philosophy, since so widely accepted, into Ethic, Physic, and Logic^e.

No ground-plan of Philosophy among the ancients gained so wide a currency as this. Aristotle, though he did not employ it as his scientific

^c *Sext. Empir. adv. Math.* vii. 1. Ὁ μὲν γὰρ Πλάτων πάντος μέρους φιλοσοφίας αὐτῷ μεταδίδωσι, τοῦ μὲν λογικοῦ, παρ' ὅσον περὶ ὄρων καὶ διαρέσεων καὶ ἐτυμολογίας παρειαίηται ζητῶν, ἅπερ ἔστι λογικά· τοῦ δὲ ἠθικοῦ, ὅτι περὶ ἀρετῆς καὶ πολιτείας καὶ νόμον διασκέπτεται τοῦ δὲ φυσικοῦ, ὅτι καὶ περὶ κόσμου τὶ καὶ περὶ ζωογονίας καὶ ψυχῆς πεφίλοσώφηκεν, ἔνθεν καὶ ὁ Τίμων αἰτιᾶται τὸν Πλάτωνα ἐπὶ τῷ οὕτω καλλωπίζειν τὸν Σωκράτην πολλοῖς μαθήμασιν.

^d *Metaphys.* xii. 4. Δύο γὰρ ἐστίν, ἃ τις ἂν ἀποδῶν Σωκράτει δικαίως, τοὺς τ' ἐπακτικοὺς λόγους, καὶ τὸ ὀρίζεσθαι καθόλου.

^e See *Diog. Laert. Proem. Segin.* 18.

division, yet in practice adopts it^f. Epicurus recognised it also, though he gave to the logical section the name of "canonic^g." The Stoics accepted it without any such alteration of terminology. So generally admitted was it, that it was forced in some sense, by popular opinion, on those who would not otherwise acknowledge it. Sects, which denied its validity, or were ignorant of its existence, were tried by its standard. Thus we are informed, (of which more hereafter) that the Cynics confined their attention to Ethic, and neglected Physic and Logic^h.

It is to our purpose to see, what prominence, what place and office, the different schools assigned to the logical limb of this division. A few preparatory remarks will enable us the better to see the real nature of the question on which they

^f Top. i. 12. §. 5.

^g Diog. Laert. lib. x. Seg. 29, 30.

^h Diog. Laert. vii. 40.

ⁱ Diog. Laert. vi. 103. Far more out of place, and for that very reason more strikingly illustrative of the prevalence of this division, is the statement of Philo Judæus, (Quod omnis probus liber) that the *Essenes* cultivated Ethic to the exclusion of Logic and far the greater portion of Physic. It is startling to find St. Jerome applying it to Holy Scripture in the following passage. "Quomodo Philosophi solent disputationes suas in Physicam, Ethicam, Logicamque partiri, ita et eloquia divina aut de natura disputare, ut in Genesi et in Ecclesiaste: aut de moribus, ut in Proverbiis et in omnibus sparsim libris: aut de Logica, pro quâ nostri theoricen sibi vindicant, ut in Cantico Canticorum, et Evangeliiis." Epist. ad Paulum Urbicum de interpretatione Alphabeti Hebraici, ad init.

parted company, and the reasons which rendered it incapable of a satisfactory solution.

The ancients used the term Logic in a much wider sense than we do. As physical Philosophy included all the phenomena of the outward world, and, if we can allow a soul to brutes, those of the "irrational soul" also; as Ethic considered all questions of directly practical import, so the whole world of mind came under Logic. It dealt with mental laws, whether these laws were considered as the means of investigation, or its object. If the application of reasoning could solve a question without appeal to observation or experiment, its solution belonged to this branch of Philosophy. If the nature of the rational soul was considered, Logic claimed it as its province. If a system of rules was to be constructed, fitted to aid in the ordinary investigation of truth, here too Logic was at home.

The word then was taken in too broad a sense to be distinct in its meaning. Metaphysic, or the science of thought as belonging to the rational soul, in the first place fell within it. Then it included Logic proper, or the system of rules for reasoning grounded on the laws of thought. Lastly, it included Logic applied—the concrete of these rules, and the matter of any particular question which they enabled the enquirer to determine.

The clear mind of Aristotle did not fail to discern this equivocation. He saw the difference

between the metaphysical truths on which the rules of reasoning are grounded, and the rules of reasoning themselves. His usage of language on this point is not however that to which we are now accustomed. Logic is with him the more general term; Analytic, the more restricted^k. Our Logic corresponds to the latter rather than to the former. Thus, on the one hand, he calls it a logical question, whether there be one science of contraries, or not; on the other hand, he describes Rhetoric, which we should characterize as the union^l of the science of human nature, and Logic, as a combination of Politic and Analytic^m. The opposition therefore between logical and analytical, in his mind, would answer to that between metaphysical and logical, in ours. There is of course nothing implied in this antithesis, which could hinder him from viewing Logic generical, including Analytic and much more, as one great section of Philosophy, in contrast both with Ethic and Physic.

Plato, on the other hand, it is well known, courted of set purpose the fusion of these two ideas—of the law, and the rule, of thought; of the basis on which Logic is built, and the logical building itself. Though a variety of authorities attribute to him the threefold division of Philosophy, he does not himself explicitly state it. And Dialectic, rather than Logic, is the name by which he

^k Post. Anal. I. xxii. 21, 2.

^m Rhet. I. iv.

^l Top. I. xii. 5.

distinguishes the third number of the division. We know too, that his making those universals, which were generally regarded as the creatures of Logic, real existences, and identifying them with his ideas, led him to include under one name the formal and the real scienceⁿ. His Dialectic was not a mere intellectual discipline, or a bare organon of truth, but a summary of the highest, and, in some sense, the only real knowledge.

It will be seen, then, that these two great authorities, however much they differ on other points, agree in one. They both exalt Logic above Physic and Ethic. Plato's reason was obvious: Dialectic was the one great science to which, in his opinion, other sciences owed not only their apparatus, but their very aim and purpose. And Aristotle, taking, as we have seen, Logic in its broadest sense, made it include far too much, to be at all tempted to underrate it.

The two great schools which succeeded in Greek philosophy assigned Logic a far lower importance. The Canonic of the Epicureans was restricted within very narrow bounds, and sometimes confused with their Physic^o. And the Stoics, who also subordinated it to Physic, introduced also Rhetoric and other extraneous matters into the province which it seemed of itself no longer equal to fill^p.

ⁿ Metaphys. xii. 4.

^o Diog. Laert. x. 30.

^p Diog. Laert. vii. 41.

But, as two schools of Philosophy arose before Logic had its origin, so also two, which were almost contemporaneous with its most flourishing days, shut their eyes and refused to acknowledge it. One of these was that of the Cynics. We have seen above¹, that the rejection of Logic was formerly laid to their charge. The accusation which is so directly made might have been inferred from their known opinions. Antisthenes and his disciples denied the possibility of definition² and of contradiction³. The one position is inconsistent with a belief in the accuracy of knowledge; the other even denies that it is attainable. For, if there be no contradiction, there can be no antithesis between truth and falsehood; if there be no definition, truth may exist indeed, but with such indistinctness and uncertainty of outline as to defy a sure recognition. In each opinion the same tone of mind appears. To regard Truth as something which the mind cannot really grasp, is a long stage on the road towards disbelieving its existence.

The Cynics indeed seem to have been a pitiable sect of philosophers—pitiable too, perhaps, in the sense of deserving our pity. First of all, they turned their thoughts to virtue, which they thought both attainable and necessary. On the ethical branch of Philosophy they therefore cast no slight. But this absorbed their whole attention. On the cold un-

¹ P. 20.

² Metaphys. vii. 3.

³ Top. I. ix. 5.

impassioned countenance of their ideal Virtue they fixed their eyes, and forgot all besides. The laws of the souls, and the phenomena of nature, they alike despised. Beyond Virtue, all seemed uncertain; the sophists had overthrown their faith in human knowledge, and Heraclitus had sapped their trust in the outer world. Plato invented his theory of ideas, that, by reposing all that was precious upon them, he might preserve the confidence of men both in knowledge and goodness. The Cynics thought that their doctrine of impassibility saved Virtue from the general crash, and calmly allowed the sea of doubt to sweep all else away.

Very unlike paths lead different men to the same conclusions. The Cyrenaics also were said to resolve all Philosophy into Ethic⁴. Aristotle himself⁵ tells us of the contempt with which Aristippus regarded Mathematics as teaching us nothing of the good and the beautiful. Morals were at any rate the principal study of the Cyrenaics, whether they entirely neglected the other branches of Philosophy, or, as is more likely from their treatises on "causes" and "proofs," only placed them in complete subordination. Perhaps indeed there was little in their whole system to claim the title of philosophy. They were bound no more to any severity of thought than of conduct. No strict

⁴ Diog. Laert. ii. 92.

⁵ Metaphys. ii. 2.

theory was needed to justify ease and self-indulgence to those who loved them.

As time passed on, the Schools, which at first occupied independent ground, came into contact. Questions, originated by each separately, were discussed in common. And we find, at a period long after the inventors of the respective systems had ceased to write and live, their descendants once more discussing points which seemed to have been settled, and ruling them anew.

In the time of Ammonius*, the Stoics, Peripatetics, and Platonists had long, he tells us, held their distinct view as to the relation of Logic to Philosophy. The Stoics, true to their old position, made it a part of Philosophy. One of their arguments is sufficiently terse and concise to deserve mention. No Art, they said, made its own instrument; Logic therefore, which is the creation of Philosophy, is not its instrument, but a part of it. The title of Aristotle's logical works was the watchword of the Peripatetics, who held Logic to be only an instrument. The argument which Ammonius puts in their mouth, has certainly a tinge of a philosophy foreign to that of their master. They argued, he tells us, that every part must have the same matter, and the same end, with the whole; but there was no such identity of subject and purpose in Logic and Philosophy. For Philosophy,

* The son of Hermias, who flourished circ. A.D. 470. See his *Treatise on the Categories*, pp. 6—8. Ed. Venet. 1595.

they proceeded, had *things* for its matter, and *assimilation to God* for its end; while the subject of Logic was Language, and its aid, Demonstration. The conclusion at which they arrived was true; the way of attaining it, if it was really theirs, proves how the school of Aristotle had degenerated in those bad times.

The Platonic view, we are informed by the same authority, was, that Logic was both a part and an instrument of Philosophy. These Platonists, too, argued rather childishly. A hand, they urged by way of example, is an instrument of giving and taking, a part of the whole body. Of course there is nothing wonderful in the same thing's being a part of one thing and an instrument of another. There is something more philosophical in a distinction which they drew, with a like object, between Logic when viewed as an independent system of rules, and when actually applied to some particular subject. Regarded abstractedly, as in the former case, it seemed to them an instrument of Philosophy; taken in the concrete, as in the latter case, it became a part. Thus, while they sided theoretically with the Stoics, their mode of expression tended practically to that confusion of Logic and Science, which afterwards prevailed among the Schoolmen.

Thus much of the views which the principal schools of ancient Philosophy held regarding Logic. Their want of distinctness and consistency

is obvious. The reason of this deficiency has been hinted at more than once. Falling short of a definite conception of Logic itself, they could attain no distinct statement of its relation to other subjects. Human reason at large, and reasoning, or the exercise of the inferential faculty particularly, and language, in which reason finds its expression, may all be investigated like any other subject, and therefore brought under one or more sciences. Such science or sciences would of course be a part of Philosophy. And the Greeks, employing a single word to express at once thought and language, would naturally call such a science, *Logical*.

This combination then of Metaphysic and universal Grammar, though scarcely deserving to give a name to the most important division of Philosophy, would nevertheless rank under it. Aristotle and Plato were right in insisting on its claim to this honour; the Stoics and Epicureans trod on the verge of error, when they lowered the laws of thought in their esteem to the level of the rules which are grounded on them, and the Cynics and Cyrenaics were undoubtedly wrong when they despised this branch of knowledge altogether.

But Logic, in the sense which we give to the term, is not a Science, but an Art. Not directly adding to our stock of abstract truths, but serving to extend in all directions the domain of general knowledge, it is not a part of Philosophy, but the

organon of Philosophy at large. And it was to Logic proper, as an art, that the enquiries of the later Schools which have been mentioned above referred. The Peripatetic position, that it is an instrument, is in this way perfectly correct. It was an anticipation of the modern idea of the subject, and was only too early to bear fruit. The Platonic statement has the air of a verbal compromise, but agrees essentially with the Peripatetic. The Stoical opinion is indefensible. That School held fast to its ancient dogma without understanding it. Though it might be rash to assert with Hooker, that they "accounted stupidity the highest top of wisdom," they certainly showed for the most part more obstinacy in retaining a position than skill in defending it.

The view of the later Peripatetics, we have said, was alone correct. But it was planted among the fragments of a ruined philosophy, and failed to take root. The ancients, on the whole, subscribed to the formula, that Logic is a part of Philosophy. Turn we now to the Schoolmen, and see, how through their researches we have journeyed by a tortuous road to Truth.

⁷ Eccl. Pol. VI. vi. §. 6.

CHAP. II.

THE MEDIEVAL VIEW OF THE RELATION OF LOGIC
TO SCIENCE.

THE stream of knowledge, though it always flows, never flows evenly for long together. It often seems to divide, and its portions to take different courses. But the separation is seldom final. The severed streamlets form an island, beyond which they unite. The smaller body of water flows perhaps straight onward, through a confined and artificial channel. The main stream makes a longer circuit, but both join at last.

We may apply our metaphor, and say, that ancient Philosophy ran in a comparatively narrow course after Aristotle. The late Peripatetics, we have seen, kept and carried on, with regard to Logic, the true doctrine of their master. But Philosophy in general took a different turn. Aristotle himself, and not the opinions of his school after him, formed the text which exercised the commentatorial spirit of the middle ages. The Schoolmen set a very different value on Logic from the Peripatetics. It was fated to rise to a still

greater height in the world's estimation, before it sunk to its proper level. Aristotle and Plato had made Logic *a part*; it is not too much to say that the Schoolmen made it the *whole*, of Philosophy.

Aristotle, like many other great men, left behind him a mighty idea, for the future, if possible, to evolve. That idea was the great ruling science of *Wisdom*. Towards this he pointed the aspirations of all who would be good and happy. He thought it unattainable, certainly to the majority of mankind, perhaps to all. Yet, in spite of his love of the practical, he could not refrain from dwelling on it. If ever he is enthusiastic, it is on this subject; some portions of the *Metaphysics*, read, in consequence, like fragments of a philosophical romance.

The Schoolmen caught from him the same idea, and were enraptured with it. We shall not wonder at this, if we consider how great were the promises it held out, to those who thought it practicable.

Aristotle's Wisdom is nothing less than a deductive theory of the universe. The mind which has attained it is represented as in some sense sovereign over all that it surveys. The truly wise men, unlike the mass of mankind, who are slaves to sense, and see but consequents without the antecedents, and touch only the last and lowest link of the chain which connects heaven and earth, stands at the source of all knowledge, and sees things in their causes. His reason follows the order of the

creative Mind. Whatever is first in nature, is first also to him.

And the mental act which this Wisdom implies is of the most perfect kind. All is calm contemplation. The turmoil of inference is over, and pure intuition has succeeded. The mind's eye does not wander here and there in quest of some worthy object, but is fixed for ever in intellectual serenity on the face of Truth.

Viewed only as a habit of the mind, it rose so high in dignity and perfection. Nor were the subjects with which it dealt unworthy of its own elevated nature. It is depicted in a threefold aspect, answering to the division of that which it contemplates. Its highest phase is Theology,—which dwells on the thought of the self-existing Substance, a pure intellectual Being, ever active; the first Cause; itself unmoved, yet the source of all motion; eternal, indivisible, omnipresent; in a word, the Aristotelian God.

Its two other divisions are Mathematic and Physic. These words, to a great degree, explain themselves. Of the latter, however, we should observe, that it took a much wider range with Aristotle than with us, including, to a great extent, the laws of mind as well as of matter,—the laws of all phenomena, in short, which are not reducible to the formulæ of space and number. Under this broad sense of Physic falls the Philosophy both of Morals and Art. The wise man does not indeed descend from his

theoretic elevation to give rules for guiding conduct, and forming taste. To the lower parts of Philosophy it belongs to train men to the love of goodness and the perception of beauty. But when art and education have not only brought forth fruit in practice, but have also developed character, and elicited Ideas which had else lain dormant in the mind, Wisdom can then, without loss of caste, regard them. She adds to her contemplation of Absolute Being, and, in subordination to this, of the laws which move the framework of the Universe, a knowledge of those principles also, on which depend the Good and the Beautiful.

Such was Aristotle's wisdom, perfect in its subject, which is co-extensive with law and order; perfect in its method, which is that of the creative Mind, starting with the simple idea of Being, and descending thence in regular sequence through the whole array of including and included universals; perfect in the nature of its contemplation, which sums up in a single term the whole series of causation, and grasps by a simple intellectual act what has been called "the Mundane Idea," or the "Summary Law of Nature".

The author of this mighty plan did not, of

* References in detail are impossible, where so abstruse and wide a subject is treated so summarily. But a fuller expansion would have been out of place here. The following Chapters of the *Metaphysics* contain many of the most important passages. Lib. I. 1. 2. V. 1. XI. 7—10.

course, witness its completion. It cannot be fairly said that he ever really attempted to carry it out. We have indeed laborious collections of facts, difficult problems, subtle theories, handed down to us in abundance from Aristotle. But though he investigated almost every branch of knowledge, there was no great system to which he endeavoured to harmonize the whole. His separate treatises have their own perfection, and generally need no definite place in a more extensive arrangement. Having put before the world a scheme for the consistent organization of all knowledge, and collected large materials for the work, he left them as a legacy to posterity, to be arranged and consolidated, if it so might be, by others.

Nor did the idea fail to bear fruit in its season. The Schoolmen found the design, and thought it too striking to be neglected. Their theological stores were a large addition to the material bequeathed by Aristotle. So, with full confidence in their resources, and a perpetual reference to the original sketch before them, they attempted to rear the temple of Universal Knowledge. Where Aristotle had laid the foundation, they built; his facts, ready hewn to their hands, they incorporated with the building: his *Metaphysic* supplied them with the plan; and they took his *Logic* for their scaffold.

To mention the Schoolmen seems at once to trespass on the province of the unintelligible. The

term is vague enough; can it be otherwise, when we sum up under the title of scholastic philosophy the whole mass of thought, vast in its extent if not in its value, which occupied the minds of the learned in its elaboration between the tenth and the sixteenth centuries? If it brings up any image at all before most minds, it is a very incongruous one, in which John Scotus and Dun Scotus are in danger of losing their individuality, Roscelin and Ockham, the nominalists early and late, blend confusedly together, and Anselm and Lanfranc come into contact with Albertus Magnus and Thomas Aquinas. We are apt to think, that during the long period of scholastic dominion there was no true growth and progress; that books increased beyond number, and writer superseded writer, without any corresponding, not to say proportionate, increase of knowledge, or revolution of opinion; but that Aristotle was a nucleus round which hard words innumerable attached themselves by accretion like so much inorganic matter. But such a tone of thought is an unnecessary wrong to an extinct philosophy. Its unity of form, though by no means so great as is generally supposed, serves nevertheless to disguise from the careless observer very wide differences in substance. The opinion that the thinkers of those days must have been all very much like each other, is too rapid an inference from the undoubted fact, that they were all very unlike ourselves. If

we identify, as is usual, the Scholastic and Mediæval Philosophy, we must not forget, that there were as truly within it subordinate schools, as there had been in ancient, and are in modern times, in spite of the greater resemblance of form which they acquired, as, treating all subjects in a single view and in a conventional language, they expanded with difficulty, and often with danger to their advocates, under the watchful eye and stern admonition of Church-authority.

The great point of similarity among the Schoolmen is indeed that feature of their writings with which we are most concerned—the uniform presence of a dialectical spirit. Some of the traits which we should be most apt at first to select as characteristic are by no means universally present. Their devotion to Aristotle, for instance, is not invariable. The master of sentences himself, Peter Lombard, has been observed never to quote him; and with several of the early Schoolmen, the Neoplatonic element preponderates over the Peripatetic. The commentatorial spirit, again, prevailed not so generally among them as it is said to do now among the literati of China. It does not distinguish, for instance, the scholastic works of St. Anselm; and the master-pieces of school-labour, the *Book of Sentences*, and the *Sums of Theology*, are in the form of questions and distinctions, not of comment. Some would make realistic opinions a test of the Schoolmen; yet Roscelin

and Abelard are often reckoned in their number, and no one denies Ockham that doubtful honour. They are characterised more surely, as we have said above, by their absorbing devotion to Dialectic. This it is which keeps them poised in the region of intellectual abstraction, equally removed from the pleasing illusions of imagination on the one hand, and the stern realities of observation and experiment on the other. This is the principle of unity, which assimilates to itself all the subjects of which they treat, and reduces to a dreary sameness the widest and most varied range of discussions. But our object is not to delineate the scholastic Philosophy generally. The connection it formed with the Aristotelian idea of Wisdom, and its consequent identification with Logic, alone concern us at present. Peculiarities such as these, though they may be stated in the abstract, cannot be described and rendered intelligible, without some aid of example. And to none of the Schoolmen should we so naturally turn, as to Thomas Aquinas. Several reasons prove him particularly adapted for this purpose. He is perhaps, of all his tribe, the most complete and systematic: and the fact, that when the day of his full power was over, he continued, and still continues, to exercise a real influence over students of a certain portion of Philosophy, fits him still more for our object, when we are treating of the scholastic doctrines mainly with regard to the view which they forwarded on

a single important question—the relation of Logic to Science. Though, were we attempting a portrait of the perfect Schoolman, we should still do best to refer to him. He is, in many ways, the best specimen of his class. He wrote at the time when the School-philosophy seemed to have completely recovered from the attack which threatened it with destruction in its infancy, and which Ockham afterwards renewed to its ultimate downfall. He unites in himself to a remarkable degree the theological and philosophical traditions of former days; Augustine was his acknowledged authority in matters of religion, and Averröes, to an extent of which he was not himself aware, his leader in the interpretation of Aristotle. The earlier Schoolmen wrote in fear, often well-grounded, of the interference of the Church; the later are thought to have pressed the system to its utmost boundaries, and to have seen glimpses of the coming reformation. Aquinas, more than any of his fellow-labourers, was fortunate in the reception of his speculations: they were never deemed of unlawful tendency, and gained for him the rare praise of uniting orthodoxy and philosophical acuteness. We may add, that his writings, at the present day, are still spoken of, if not consulted, and referred to, if not read; and alone, of all the scholastic volumes, show traces of a dubious vitality.

It will then be worth while, keeping Thomas Aquinas steadily before us as the type of the

scholastic Philosophy, to show briefly from his writings the place which logical method held in his system. Our position, be it remembered, is this—that the Schoolmen took their ideal of Science from Aristotle's Wisdom; that, in the endeavour to construct it, they began by admitting his Metaphysic; that they adopted his facts without enquiry, and placed them for purposes of argument on a par with truths derived from more sacred sources; and that thus, with premises ready to their hand, and a logical system under which to combine them, they reared a fabric of which the form was comparatively every thing, and the matter comparatively nothing; so that the truth could not be distinguished from the medium in which they exhibited it, and their method became identical with their philosophy.

To proceed then to the first point—the coincidence of the Scholastic view of perfect Science with the Aristotelian idea of Wisdom.

The great work of Aquinas is, as every one knows, his "Sum of All Theology." Theology, too, was, as we have seen, the title of the highest division of Aristotle's Wisdom. This agreement of language, even if unintentional at first, could not remain unperceived; and, when once perceived, could not be passed over in silence. Either the Theology of Aquinas was to be, like Aristotle's, the highest wisdom, or it was not; and a writer so given to definition and distinction could not

leave a point of this nature undetermined. Accordingly, he meets the question, and answers it in the affirmative. At the very opening of his great work he declares, that the Sacred Doctrine is "one single science," "speculative rather than practical," "transcending all other sciences whatsoever," in a word, "absolutely and simply wisdom".

The Christian Theology then would, according to Aquinas, approach very nearly in the terms of its definition to that of the heathen philosopher. This would indeed still leave room for a very wide distinction between them. But it would lead us to expect at least thus much, that the Schoolmen would be very careful in drawing a line of demarcation between the Divine Wisdom and Aristotle's crowning Virtue. This, however, is not the case. Thus in his comment on Aristotle's *Metaphysics*, he begins by assigning to his author's first science the very title by which he distinguishes his own. It bears, he tells us, the three names of the Divine Science, or Theology; *Metaphysic*; and the First Philosophy^b. And how thoroughly he blends in his method of treatment the human and the Divine Wisdom, how he considers them to con-

^a See *Prima Primæ*, Art. I. Qq. 2—6. where he predicates of "Doctrina sacra" successively that it is "scientia," "una scientia," "magis speculativa quam practica," "omnes alias scientias transcendens tum speculativas quam practicas," "maximè sapientia inter omnes sapientias humanas, non quidem in aliquo genere tantum, sed simpliciter."

^b Comment. in *Metaphys.* ad init.

nect themselves with the same subjects in the same manner, may be seen in the following very characteristic passage^c. "Those arts," he observes, "which govern other arts are called architectonic or ruling arts; and those who exercise them are called architects, and claim the name of wise. These artificers, however, as aiming only at particular ends, reach not the universal end of all things. They are therefore only called wise on this or that particular subject. In this sense it is said, 'as a wise master-builder I have laid the foundation'. But the name of absolutely wise is reserved for him alone, whose speculations turn on the end of the universe, which is also the principle of all things. Wherefore, as the Philosopher^e says, the wise man must consider the highest causes. But the ultimate end of every thing is that which is intended by its first author and mover. But the first author and mover of the universe is Intellect. Therefore the ultimate end of the universe must be the good of Intellect; which is Truth. Truth must then be the ultimate end of the whole universe; and with the consideration of this end must Wisdom be principally occupied. Therefore, the Divine Wisdom clad in flesh declares that He came into the world to

^c *Proœm.* ad *Sum.* contr. *Gent.*

^d 1 Cor. iii. 10. Aquinas quotes the Vulgate, "ut sapiens architectus fundamentum posui."

^e *Metaphys.* i. 2.

manifest the Truth, saying, 'To this end was I born, and for this cause came I into the world, that I should bear witness unto the Truth.'¹ And so the Philosopher² determines, that the First Philosophy is the Science of Truth, not however of any Truth, but of that which is the origin of all Truth."

Further proof cannot be necessary of the close connection, not to say identity, which Thomas Aquinas held to exist between Aristotle's First Philosophy and the Christian Theology. We must next show the importance he attached to the principles of the Aristotelian Metaphysic.

Though Aristotle and the Schoolmen each founded their great science on the same idea, that of Being, it by no means necessarily followed that their respective sciences should be identical. They need not ever have been to any great extent similar. The conceptions which they employed to express and bring out at length the meaning and force of that idea, might have been entirely different. They might have endeavoured to portion out the world of thought on some novel principle, and have spent their chief labour in discovering a range of metaphysical abstractions, which should give their speculation an individual and original air. In a word, as Aristotle had divided being in one way, they might have divided it in another. Had they undertaken to do so, the

¹ John xviii. 37.

² Metaphys. ii. 1.

most characteristic feature of their philosophy would have disappeared, or rather, would never have been called into existence. The endeavour to decide for themselves, what was the best and most natural division of Being, would have called observation into play, and, by giving Induction fair scope, have destroyed the exclusive power of Deduction. The course of Science might have been more rapid than it has been, had the minds of men been thus early turned to investigating new universals, instead of drawing continually new conclusions from those which were old. But the Schoolmen showed no tendency in this direction. As they had taken the idea of their science from Aristotle, they took from him the conceptions which were to illustrate it also. Without any exercise of the critical faculty, they followed him unhesitatingly in his primary division.

At the very beginning of Aristotle's *Organon* stand the *Categories*, or, in Latin guise, the *Predicaments*. They are the first broad philosophical division which meets the student of the Aristotelian method. Of what they are a division, is not so clear. Aristotle himself is generally supposed to have attained them by considerations half-logical and half-grammatical; and then to have applied them as heads under which to group *things*. Thus the question naturally arose—are the *Categories* to be regarded as a scheme for the division of nature, or of language? Either opinion had its advocates

among the ancients. Others preferred an intermediate view, and considered them as referring to the conception, which lies midway between the name and the thing. Ammonius^h, who records these different opinions, himself subscribes to a misty formula, probably of Neo-platonic origin, which blends them all, and asserts, that "the Categories have to do with words, which signify things, through the medium of conceptions."

The Schoolmen would have adopted this view, had they exclusively followed tradition. It is contained in their principal authority on the subject, a commentary on the ten Predicaments, erroneously attributed by them to St. Augustineⁱ. But they rejected as superficial and insufficient the belief, that the Categories were mainly a scheme for the division of words. It pleased them rather to hold, that they met with their counterparts in the outward world. On them they would willingly have constructed, if they could, the classification of an universal science. So Aquinas

^h De Categ. p. 14, 15.

ⁱ That Alcuin had no doubt either of the authenticity of this work, or of the value of its contents, appears from the following verses, in which he recommended it to the perusal of Charlemagne.

Continet iste decem naturæ verba libellus
Quæ jam verba tenent rerum, *ratione stupendâ*
Omne quod in nostrum poterit decurrere sensum.

Hunc Augustino placuit transferre magistro
De veterum gazis Græcorum-clave Latinâ.

tells us, that "perfect Being is that which exists, external to the mind, through the ten Predicaments^k;" and again, that "Being must be portioned out into different kinds according to the different modes of predication; for different modes of predication are attendant on different modes of Being^k." Or, as he elsewhere states his doctrine, "modes of Being are proportional to modes of predication^l." And far from making the Categories heads under which to arrange conceptions, he expressly excludes all such mental creatures from them; for "nothing is placed in any predicament, except what exists external to the mind^m." Accordingly, he attempts, with very indifferent success, to show, from considering the nature of existence, that these ten heads amount to an exhaustive division of things^k. So high indeed did he raise their dignity, that he sometimes ranges God under the Category of Substance. Though here he speaks more doubtfully than usual, at one time denying that the Predicaments at all relate to Himⁿ, at another time allowing that they do^o, though in a different manner from that in which they apply to other existences^p.

^k In Metaphys. v. Lectio ix.

^l In Phys. iii. Lectio v.

^m De Pot. Dei. Qu. vii. Art. ix. Resp.

ⁿ Prima Summæ, Qu. iii. Art. v.

^o De Pot. Dei, Qu. vii. Art. iii. ad 7^m.

^p De Pot. Dei, Qu. ii. Art. ii. 1^m. ad 1^m.

It is clear, that were the Categories thus statements of the real classes of things, a universal science would be at once possible. Under such a classification every thing might be duly ranked and ordered, and a natural system, so to speak, of the whole universe be constructed. And this was the work which the Schoolmen thought they had the power to accomplish. The Categories themselves indeed do not hold a very prominent place in their general writings. Like other abstract principles, when once enunciated and clearly laid down as true, they are traceable mainly in their consequences. They stand like so many landmarks, seen from a distance indeed, but of most continual use in guiding the mind to its decision on questions which are very remotely and indirectly connected with them. The bearings of truths derived from very different sources, from Holy Writ and the writings of the Fathers, were determined by them. This was a great misfortune to the Schoolmen, that they never suspected the existence of any discrepancy in their heterogeneous material, or at least, if the suspicion unavoidably occurred, never ventured to entertain it. Theologians at the first, they began in the school of faith, and carried their belief too far. Inspiration itself could not receive more reverence than Aristotle. Where he evidently contradicts the revealed Word, they shut their eyes to the real state of things, and look about for some other explanation. Thus

Aquinas wishes to persuade himself, that the Philosopher did not actually hold the world to be eternal, but was rather, like a subtle disputant of his own times, urging in a dialectical spirit plausible arguments against the position of an adversary¹. The Schoolmen had never heard of destroying, with a view to re-construct. Unhappy in the absence of doubt, they fell short of the philosophic mind in one respect at least—that they never learned to reject.

Logic then, as the Schoolmen thought, had a noble task before it. With so much inherited from their predecessors, all new appeal to the world of observation seemed on their part superfluous. From certain given truths they hoped by a long circumduction to infer all truth. For this purpose, logical instruments were to suffice. But the instruments of Logic differ from those of most other arts in a very marked manner. There is, in Art, generally little similarity between the tool and that on which it operates. And further, most arts confine themselves in practice strictly to singulars. The sculptor applies an individual tool to an individual block of marble: it is a given portion of a compound substance which a chemist analyses, and that by means of tests themselves of a limited and definite quantity. It is not so with the Logician. His subject, and his manner of dealing with it, are

¹ Prima Summæ Qu. xlv. Art. 1. De Pot. Dei. Qu. iii. Art. xvii.

alike general. He applies universals as the criterion of other universals. This is his work—to test, arrange, and, it may be, infer, general truths by means of general formulæ.

So thought the Schoolmen—and to a great measure rightly. How then were they to discriminate, where there seemed so much risk of confusion, between their method, and that on which they employed it? The conceptions, whether of things or classes, which their enquiries presupposed, and the apparatus of Logic itself, were alike modes of intellect. Without some especial provision, error and perplexity must ensue from their running into each other. This danger was obviated by drawing a distinction between First and Second Intentions. “A first intention^r,” they taught, “was the likeness of something existing external to the mind; as, for instance, the conception which follows on hearing the word *man*—a conception which is founded immediately on the thing.” Whereas a second intention is “not a likeness of any thing existing external to the mind, but a conception following on our mode of understanding such things. These are invented by the intellect itself; as, for instance, the conception which is signified by the word *genus*. Intentions of this kind have their immediate foundation not in the things but in the understanding: though the remote foundation is in the thing itself.” So that, to express the same

^r Aquinas on i^m. Lib. Sent. Dist. ii. Qu. i. Art. iii.

truth still more clearly in the form of a distinction not of things but of words, “nouns of the first intention are those which are imposed upon things as such, that conception alone intervening, by which the mind is carried immediately to the thing itself. Such are *man*, and *stone*. But nouns of the second intention are those which are imposed upon things, not in virtue of what they are in themselves, but in virtue of their being subject to the intention which the mind makes concerning them: as when we say that man is a *species*, and animal a *genus*.”

The scholastic apparatus was now complete. They had, as they thought, a primary classification, external to the mind, in the ten Predicaments; they had first intentions, or conceptions drawn directly from things, to range under them; they had, among other second intentions, the Predicables, which enabled them to show, how, under the light of the natural classification, the first intentions were related to each other. In other words, they had, or supposed they had, both the objective and subjective requisites of a perfect system—a valid division of existing things, and a method according to which to group all notions under this division. So, without any further delay, they betook themselves to syllogizing; to determining, that is, by means of their supposed knowledge of the nature and force of terms, the various relations which they might be supposed to

^s Opusc. xlii. Art. xii. ad init.

occupy to each other in propositions. Here they were not likely soon to come to a stand: the possible permutations of words are endless; and they did not think that they were dealing only with words, and falling far short of things. Each distinction which they drew brought forward new questions; and the solution of each question elicited fresh distinctions. Philosophy separated from a central trunk into numerous branches, which again divided and subdivided till their ultimate sections were as fine as hairs, or finer—invisible even to the eyes of those who spun them out. And, through the whole of the prolonged system, Logic every where extended itself; drew each distinction, stated each objection, answered it when stated, summed up when it gave its decision, crushed each enquiry into the same uniform shape, appealed over and over again to the same universal premises, employed unnumbered artifices to extract from these premises conclusions they were never meant to give, cut into shreds the scanty sheet of knowledge, as Dido did the hide, that it might encircle the province which it could not cover, governed absolutely all Philosophy, and as in despotic governments there is no distinction between the monarch and the constitution, was *all* Philosophy itself.

No wonder then that the highest praises were heaped upon it; that though it was confessedly only “reductively” or “indirectly” a part of specu-

lative Science, as supplying it with syllogisms, definitions, and other instruments of like kind^t, it was yet allowed to bear in common parlance the title of “the Rational Science^u,” that as directing the act of reason, from which all arts proceed, it was called “the Art of Arts^v,” and that it was held^x, “all learning must begin from Logic, not as being more easy than other sciences, (for having to deal with second intentions it involves the greatest difficulty) but because it teaches the method of procedure in all sciences, and therefore all other sciences depend upon it^y.”

^t Super Boët. de Trin. Qu. V. Art. 1.

^u In Post. Analyt. ad init.

^v Super Boët. de Trin. Qu. VI. Art. 1.

^y Old John of Salisbury gives an account of the proceedings in a certain Dialectical school with which he was acquainted, which will apply, in a less degree, to the scholastic use of Logic in general. At any rate, we may better see the tendency of the evil, by contemplating its more aggravated form. “It was the fashion to talk of nothing but *consistency* (*convenientia*) and *reason*. *Argument* was ringing in every one’s mouth. To name an ass, or a man, or any other work of nature, counted as a crime; at least was out of place, and unpolished, and unworthy a philosopher. It was thought impossible to act or speak consistently and reasonably, unless express mention were made of consistency and reason. Argument was quite out of the question, without the use of the word argument. No distinction was made, between proceeding according to an art, and treating of it. (Ex arte, et de arte agere, idem erat.)” Metalogicus, Lib. I. Ch. iii.

CHAP. III.

NOMINALISM AND REALISM.

BEFORE taking our farewell of the scholastic view of Logic, it is natural to make some remarks on the great question as to the nature of Universals, which connected itself so closely with it. Though the battle has long been fought, there is a great historical charm, and even some living interest, associated with the once-prominent party-names of Nominalist and Realist.

We may easily see the reason of the importance attached to this question, and the zeal with which it was contested. Logic, we have said, was in fact the sum of scholastic Science. And this great Science professed to deal with Universals. On these depended the whole array of questions and objections, consequences and conclusions. Their modality, so to speak, determined that of the whole system. And those who were not too busily engaged in adding to it and elaborating it, to find time for looking back, and seeing what had been accomplished, and on what foundation it rested, naturally came at last to the enquiry, what these Universals were.

Of course, the originators of this question among the Schoolmen were neither the first to ask it, nor the last. Plato, Aristotle, and the Stoics, not to mention other authorities, had each their distinctive theory of Universals. None of these were entirely satisfactory: and modern Philosophy feels the old difficulty to be still unsolved, to be lying at the basis of almost every important doubt, and to present the great check to its rapid and confident progress. In all probability, indeed, a comparatively ancient source suggested the enquiry to the Schoolmen. Porphyry, in his treatise on the Predicables, states the problem, though he declines attempting to solve it^a. "Whether," he says, "genus and species are substances, or exist in bare thought alone; or, supposing them to be substances, whether they are material or immaterial; and again, whether they exist separately, or in composition with sensible objects, I must decline discussing. The subject is profound, and needs a separate and more detailed enquiry." Its due quantity of enquiry, at least, in after-times it gained.

It is well known that Europe derived its knowledge of Aristotle from the Arabians; and that, among these, their principal authority Averroës tintured the Peripatetic philosophy with a strong spice of a spurious Neo-platonism. Under his hands, the doctrine of Universals assumed a form

^a *Isagoge*, chap. i.

something like that of Ideas. Genus and species were held to be substances, not mere attributes, much less words. Whether they existed abstractedly from matter, or were rather to be described as always present in the concrete, was a subject left for after-discussion. The theory of Averroës himself was in fact an ill-disguised Pantheism; which, when applied to certain subjects, led to results which so displeased the Schoolmen, as to prevent, even when such objections did not occur, its formal and explicit reception. Here their theology came in as a safeguard to their philosophy; they shrank as Christians from the view which he held, that one common human intellect existed, of which each individual intellect was a part^b. But they followed him so far as to conceive, that the Universal was an actual *thing*; and thus, before Nominalism was heard of, Realism, or a belief in the existence of Universals as substances, and not merely as attributes of the mind of man, was the current belief of the early Schoolmen and their immediate predecessors. It suited the feelings of those, who, like Scotus Erigena,

^b "A view," Thomas Aquinas argued justly, (Opusc. xvi. contra Averroistas,) "which is repugnant to the truth of the Christian Faith. For intellect appears to be alone, of all the parts of the soul, incorruptible and immortal. Now supposing diversity of intellect to be removed from all men, it follows, that, after death, nothing of human souls would remain except their intellectual unity, and thus all retribution of reward and punishment would be removed."

were mystically inclined; it could not be disagreeable to those argumentative spirits, who were anxious to maintain the honour of Dialectic. But, though thus in possession of the scholastic mind at the first, it did not establish its supremacy without a struggle. The Nominalist attack showed at once its strength and its weakness. It called forth the hidden strength of Realism, by proving that it was entwined with the very roots of the School-philosophy, which could not ultimately but stand or fall with it: it also betrayed its weakness, by showing that it lacked the distinctness of a true and consistent theory, and assumed very different shapes in the minds of its different supporters.

The history of Nominalism divides itself into two very marked periods. During the former of these, it was forcing by its attacks the scholastic philosophy to assume a more definite form than it had hitherto taken, and was so hurrying on its own temporary defeat; during the latter, it was sapping the strength of that mighty system, by introducing into its inmost heart an element of doubt. In both periods, it connected itself with theological questions, in feeling and tendency, if not by the links of strict consequence. Nominalism has often been called, and justly, the precursor of the Reformation. And as those who first aimed unsuccessfully at a reformation were more violent in their opinions than those who took up the work afterwards, and succeeded; so the earlier Nomi-

nalists, doomed from the first to fail, were more extravagant and far less philosophical in their teaching, than the happier band whom Ockham led on to victory.

Roscelin of Compeigne was confessedly the founder of the sect of the Nominalists. The term at first was meant to indicate that its adherents bestowed their attention on language, and held Universals to consist in *names*. Though it was natural that the Realists should endeavour to give it still further force, in applying it as an allusion to what they thought the merely *verbal* knowledge of their antagonists. And so Aventinus, even when looking back upon the past, explains it. "Roscelin," he says, "the founder of the new Lyceum, first cultivated the science of words and phrases, and discovered a new way of philosophizing. To him we owe it, that the Peripatetics, or followers of Aristotle, divided into two classes—the older, rich in invention, and claiming for itself the science of things, and therefore called the *Real* school; and the later, disturbers of this science, and called Nominalists, because, niggardly of things, but prodigal of names and notions, they appear to be the partisans of words^b." This is neither a very

^b *Annales Boiorum*, lib. vi. p. 406. ed. Basil. 1580. Aventinus died about 1533. A reproach grounded on a name is of course little to be trusted. "Who can confute a sneer?" And praise on like grounds is equally deceptive. Luther commends the later Nominalists, on the strength of another name they bore, with

profound nor a very fair account of Nominalism in general. But it serves to show the feelings with which its advocates were regarded down to a comparatively late date, as sceptics who would lower the dignity of Dialectic, curtail the region of Science, and suck out the very marrow of Philosophy.

Roscelin himself, indeed, appears to have deserved the name of Nominalist in its fullest and most unfavourable signification. He advocated the position that Universals were nothing but names—a position which, as we shall see hereafter, has little to be said in its favour, and if consistently maintained, is fatal to all true philosophy. The error did not remain unrebuked: for he drew upon himself the powerful opposition of St. Anselm. This distinguished theologian and dialectician had another hold upon his adversary. Roscelin had been also guilty of heretical doctrine concerning the Holy Trinity^c. St. Anselm in-

about as much reason as Aventinus condemns the earlier. "The Terminists, among whom I was, are sectaries in the high schools; they oppose the Thomists, the Scotists, and the Albertists; they are also called Occamists, from Ockham their founder. They are of the newest sect, and are now strongest in Paris.....They are called Terminists, because they speak of a thing in its own proper words, and do not apply them after a strange sort.....Ockham was an able and sensible man." *Table Talk*, pp. 540—2.

^c Roscelin taught, "*tres personas esse tres realitates diferentes*." Anselm's remarks are indignant enough. "All," he says, "should be warned to touch most cautiously on questions of Holy Writ. But these dialecticians of our time, and heretics even in their

geniously couples the two mistakes together as cause and effect. The bad dialectic accounts for the false theology: and the false theology is proof certain of the badness of the dialectic. The issue of the contest was not long doubtful: Roscelin was forced to retract his errors at the Council of Soissons^d. The victorious Anselm became next year Archbishop of Canterbury. The defeated innovator was banished both from England and France^e. In a few years, John of Salisbury informs us, his opinions were almost extinct^f.

Another ill-starred name, that of Abelard, follows Roscelin in the history of dialectical innovation. Whether Roscelin was his instructor in their common art is doubtful. On the one hand, there is old authority for such a supposition; on the other, Abelard is silent on the point in his account of his own life, in which he displays no disposition to reserve. But perhaps a reason for the omission may be found in his circumstances. He had

dialectic, men who take universal substances to be nothing but word of mouth,.....should be altogether excluded from disputing on spiritual things.....He who does understand in what way several men are yet in species but one man, can such a one comprehend how, in the secret depths of the Divine Nature, of several persons each shall be perfect God, yet all be one God?" *De Incarnatione Verbi*, (otherwise, *De Fide*), ch. ii.

^d A. D. 1092.

^e Abelard, *Epist.* xxi.

^f His words are, "alius consistit in vocibus; licet hæc opinio cum Roscelino suo fere omnino jam evanuerit." *Metalogicus*, ii. 17.

himself to bear the imputation of heterodoxy, and would naturally shrink from the weight of obloquy which attached to another. Indeed he goes out of his way to condemn in strong terms both the logic and the theology of Roscelin^g. There was the more need for caution here, because their opinions might by the careless or unskilful be confounded. For Abelard, though not in the strictest sense of the word a Nominalist, was at least an Anti-realist. John of Salisbury thus records the distinction between them^h. "The one (meaning Roscelin) takes his stand on words; the other on propositions:" and he expressly ascribes the latter view to Abelard.

It is hard to affix a very definite meaning to this statement. The most probable interpretation is that of Degerandoⁱ, that he believed Universals, without having a strict independent and objective reality, to be conceptions—conceptions, however, which, to be formed and retained in the mind, must rest upon the signs of language; and that

^g *Epist.* 21. "Hic sicut pseudo-Dialecticus, ita et pseudo-Christianus, cum in Dialecticâ suâ nullum rem partes habere æstimat, ita divinam paginam impudenter pervertit, ut eo loco, quo dicitur Dominus partem piscis assi comedisse, partem hujus vocis, quæ est piscis assi, non partem rei intelligere cogatur." Fairness in dispute was no characteristic of those days.

^h *Metalogicus*, ii. 17. I have Englished "sermones" by "propositions," believing John of Salisbury to have had the Greek λόγους in his mind.

ⁱ *Hist. Comp. de Philosophie*. Vol. iv. p. 403.

therefore he made them turn, not, like Roscelin, on the simple term, but on the proposition, which expresses the relation of subject and attribute, as they are apprehended by the understanding. Scarcely any other position indeed in the scale of thought upon this subject remains for him to occupy; for while he dissented from the pure Nominalism of Roscelin, he fell short of pure Conceptualism; those who placed Universals among the creatures of the understanding, as the Conceptualists do, being mentioned by John of Salisbury as a distinct sect: and his own writings would prove, even in the absence of external authority, his decided aversion to Realism^k. But Abelard, with all his niceness of distinction, did not escape from the dialectical field unwounded. Like Roscelin, he had the honour of being defeated

^k He relates with great gusto his contests with his old instructor, William of Compeigne, and their successful termination. "I forced him by most conclusive arguments to modify, or rather to surrender, his old opinion concerning Universals. He had been of that mind with regard to their general nature, that he asserted the same nature to be present at the same time essentially in each of the individuals. It followed that among these individuals there was no diversity of essence, but only a variety in the multitude of their accidents. But afterwards he so reformed his opinion as to say, that the same nature was present in them not essentially but indifferently." (i. e. as much in one individual, as in another.) Abelardi Vita, cap. ii. A decision which leaves the question open after all. Though the distinction meant to be drawn would seem to be like that made afterwards in the disputes between Scotists and Thomists between *real* and *formal* presence.

by a great antagonist. In this their lot differed, that Roscelin fell by the hands of one who wielded weapons like his own: while the brand of theological unsoundness was fixed upon Abelard by one, whose mind, occupied by its own beautiful mysticism, hated the philosophizing spirit of the day. It is more an honour to him in our eyes, than it was a consolation in his own, that he owed his overthrow to St. Bernard.

But if in those days the imputation of Nominalism was fatal, Realism was not always a protection from error. A contemporary of Abelard, Gilbert de la Porée, is an example of this. He was a Realist, but a bold one. The extent of his boldness in Dialectic has indeed been much overstated. His treatise on the Six Principles has been described as an endeavour to cut down Aristotle's Categories to six. But he was guilty of no such presumption. He only endeavoured to expand the six later Predicaments, which Aristotle had passed cursorily over, after the plan on which the Philosopher had treated the first four. In introducing these in their new shape, he goes so far as to hazard a definition of form. "Form," he says, "is contingent on matter, consisting of simple and invariable essence^l," and flatters himself that this

^l Forma est compositioni contingens, simplici et invariabili essentiâ consistens.—Erit itaque terminus formæ dicta definitio, neque enim superflua neque diminuta, si quis subtiliter investigaverit, reperietur."

formula will endure a searching criticism. It would have been happy for him if he had confined himself to such harmless innovations. But the same spirit led him wrong elsewhere; he too was condemned for departing from the doctrine of the Trinity.

It was reserved for a pupil of Abelard to effect what his master in common with others had so unsuccessfully attempted—the union of Philosophy and Theology. Peter Lombard effected this end, by reversing the procedure of previous scholastics. They had first formed their dialectical notions, and then applied them to things divine. He, taking his ground on the received Theology of the time, accommodated Dialectic to it, and so freed it from suspicion. His cautious Book of Sentences became in after times the basis of comments much bolder than the text on which they were founded. Orthodox in faith and philosophy, he completed for the time the victory of Realism. And, like all other principles that are not sound at heart, though a good watchword in a battle, it becomes uninteresting and unprofitable, immediately on its success. We will proceed at once to some considerations, which will bear upon the history of its fall.

Realism, though now, as it seemed, firmly and finally established, was not really safe. There were enemies within the camp from the first. John of Salisbury, who died as early as A. D. 1182,

recognises no less than six different sects of Realists. These may be, however, fairly reduced to four;—those who adopted the Platonic doctrine of ideas, and held that the names of genera and species belonged properly only to those objectively existing Universals;—those who considered that the individual contained the whole essence of the class, and was in fact, when viewed from a certain point, itself the Universal, as when it is said that Plato is, as to his manhood, a species;—those who asserted that the whole aggregate of individuals was identical with the Universal;—and those who regarded the Universal as a substance in some way existing *in* the singular. These sects, it will be seen, agree in nothing, except in all calling Universals, *things*.

The three former views, however, ultimately gave way to the last, of which Aquinas was the great advocate. It became a received doctrine, that the one Universal existed *in* the many individuals. But this basis of agreement did not shut out all dispute; the meaning of the formula was not so clear, but that enquirers would ask, *how* the Universal existed in the individuals?

On this point, there was an ominous schism of the Schoolmen. Dominican and Franciscan could not agree even on the abstract questions of Philosophy. Their differences extended from questions of free will and predestination to Logic. The school of Scotists arose, and called into existence

the rival school of Thomists as defenders of the great Dominican authority. The followers of Aquinas held, that the Universal existed *really* in the individuals; the disciples of Duns Scotus maintained that it existed only *formally*^m. The latter went so far, as to abandon the old title of *Realists*, and assume that of *Formalists*: in order that their very title might protest against the doctrine of their antagonists. And, without endeavouring to explain the subtle distinction between Realism and Formalism, we may assume that the innovators, in rejecting the old watchword, virtually, though unconsciously, relinquished the cause which it had symbolized so long.

The Scotists themselves were, or thought they were, still opposed to Nominalism. But the next generation of thought showed the actual tendency of their views. Out of their school rose Ockham, and with him the opposition to Realism revived once more. In impugning the doctrine of the existence of Universals as substances, he directed his attacks especially against Scotus, under whom he had studied. We must not confound his opinions with those of Roscelin and his disciples. Ockham,

^m It should be observed, that the two doctors did not themselves come into contact. Thomas Aquinas died A.D. 1274. The chronology of Duns Scotus is doubtful; but taking the most probable date of his death A.D. 1308, and following the account which gives him the short life of 34 years, we should fix his birth in the very year in which Aquinas died.

in asserting that Universals existed, but existed only in the mind, answers exactly to a modern Conceptualist. His teaching was on this point clear, distinct, and sound, though expressed and defended with a quaint and technical minuteness of accuracy, which proves him every way a match for any of his scholastic brotherhood.

“ⁿ Every Universal,” he taught, “is really a Singular in itself, and therefore is only a Universal in virtue of its signification, which is a sign of many things. This is the doctrine of Avicenna, who teaches, that a single form in the understanding is related to a multitude of things, and is therefore a Universal, because it is an intention in the intellect whose operation does not vary to whatsoever you apply it. It follows that this form, though in relation to the individuals it is a Universal, yet in relation to the mind on which it is impressed is itself only an Individual, for it is one of the forms which are in the understanding.” This is a specimen of his positive reasoning: his negative goes to prove generally that “no Universal is any thing external to the mind.” It may be worth while to show how he fought his adversaries with their own weapons. “^o No Universal,” he urges, “is a singular substance, for, this granted, it would follow that Socrates is a Universal: for there is no more reason why one singular substance should

ⁿ *Summa totius Logicæ*, ch. xiv.

^o *Ib.* ch. xv.

be a Universal than another." This is rather an endeavour to throw the weight of the proof upon the adversary: the following is a more direct and at the same time more complete argument. "If any substance be, as is supposed, more things than one, it must be either several Singulars or several Universals. If the former be allowed, it follows that a certain substance will be, e. g. several men; and then although the Universal will be distinct from any one particular man, it will necessarily be the same with all the particulars together. But if we take the other alternative, that one substance is several Universals, we must then ask the question—is this Universal several things, or only one? If the answer be that it is only one, it follows that it is really a Singular; if the answer be that it is several things, I enquire again whether it is several Universals or several Singulars; and so on to infinity." Theology too was brought to bear on the point at issue. "If the Realist opinion were true, God could not annihilate one individual without destroying all; for to annihilate any individual He must destroy all that is of its essence. Consequently, He must destroy the Universal which exists both in it and in other individuals; and these could not continue to exist, when deprived of a part of their substance, such as the Universal is supposed to be." We will not endeavour to follow him, where, in discussing the Scotist opinion of

the *formal* presence of the Universal in the individual, he refines on a refinement^p.

Opinions like these, not long after the opening of the fourteenth century, were published by Ockham from the Theological chair of Paris. They produced as much excitement as either friend or enemy could have desired. And argument was not the only means of discussing them employed. Ockham himself, for the ready support which he gave Philip the Fair against the Pope, by vindicating the rights of the temporal power, and other like acts of insubordination, was rewarded with the pontifical anathema. In more than one University the new doctrines were contested with blows and bloodshed. When we remember that the opinions both of Scotus and Ockham were probably formed within the walls of Merton, we should be surprised if Oxford had been backward in the dispute. Direct persecution was brought to bear in Ockham's other University of Paris, and

^p Another specimen of his theological reasoning, though curious and characteristic, may be better thrown into a note, and preserved in the Latin. "Item sequitur quod aliquid de essentiâ Christi erit miserum et damnatum: quia illa natura communis existens realiter in Christo et in damnato erit damnata, quia in Judâ. Hoc autem est absurdum." Ockham here uses just the same kind of argument against the Thomist supposition of a common human nature, as Aquinas himself had employed against the Averroistic tenet of a common human intellect. How hardily, and apparently without any sense of their hardihood, did these men venture to bring objective truths, and subjective convictions, into the most direct collision.

elsewhere. Louis the Eleventh, by an edict which did not prove ultimately successful, condemned the Nominalist teaching, and forbade the study of the works of Ockham and his most famous disciples. So the University of Leipsic owes its origin to the expulsion of the Nominalists from Prague. It is said that the Universities of Vienna and Heidelberg^a were Nominalist from their foundation. Aventinus, who flourished at the beginning of the sixteenth century, mentions that the schools of Paris, Erfurt, Ingolstadt, and Vienna, were then in Nominalist hands. The opinions of Ockham, when for the time silenced in France, had thus, after taking root deeply in their native home of England, extended themselves to Germany. Luther, Melancthon, and other reformers, professed their allegiance to them. It would seem the old Theology could scarcely have been assailed, except with Nominalist arms. It would have stood impregnable against any foes but such as were acquainted with its form and devices, while they had detached themselves from its spirit.

Enough has now been said on the history of this great question of the mediæval philosophy. We have seen how Realism triumphed in the first great contest of opinion; and how, in the security which followed on this triumph, diversities once more crept in, till Nominalism at last revived. Revive it

^a The University of Vienna was founded A.D. 1365; that of Heidelberg A.D. 1346.

needs must, after the speculations of Duns Scotus. The belief had not strength and foundation enough to exist without the symbol. When the Scotists took the name of formalists, they virtually gave up the cause to which they professed to adhere. Ockham's claim to distinction lies in the skill and perseverance with which he urged his opinions. The course of things must have led many men simultaneously with him to entertain them.

And now it may be asked—who were in the right, Nominalists or Realists? The query deserves an answer, for the question about the nature of Universals is not merely one of words. More importance, indeed, was attached to it in the middle ages than it deserved. But men were wrong in this matter, only because they were consistent. They considered the question as a logical one, and their Logic identified itself with their Philosophy, and their Philosophy ran up into Theology; and Theology was in those days a subject of very direct and personal import. We are indifferent to Universals now, because the ruling of the point either way would not immediately affect daily life, or the opinions of practical men. It is this, and not any superiority to the difficulty, or successful solution of it, which has allowed the cries of Nominalist and Realist to die away.

We will endeavour therefore to bring the dispute to an issue; and, that we may the better do so, will first define our terms. Here Etymology

comes to our aid. Nominalism, in its strict sense, indicates a belief, that Universals are only names. Realism asserts that they are things. Convenience suggests that we should adopt a third term of later origin, Conceptualism, as expressing the opinion of those, who hold Universals to be conceptions.

Nominalism then, in its strict sense of a belief that Universals are only names, is indefensible. Roscelin, who held it, deserved the censures which were heaped upon him as the virtual destroyer of Philosophy. More will be said upon this point, when we come to the logicians of the verbal school, the legitimate successors of the Nominalists. Suffice it for the present to say, that they make, of necessity, the operation of thought merely mechanical, and invert the obvious facts of the case by making reason a function of language, instead of seeing in language a consequence of reasoning. Formal argument against them is unnecessary. Their own speculations sufficiently confute them, which they would refuse to admit to have no other subject than words. Like the dogmatical sceptics who asserted positively that nothing could be known, they are silenced, or should be, by their own protestations.

It must be remembered, however, that other opinions beside those of Roscelin bore the title of Nominalism. It would be unjust to fix it in its original meaning, in spite of his protest against the doctrine, on Abelard. It became indeed synonymous with anti-Realist, and descended to Ockham

and his school as their natural heritage. But Ockham was really what we should call a Conceptualist. We have seen that he held Universals to exist, and that really, in the mind; to be, in fact, mental forms, singular in themselves, but universal in their application. Thus every common term would represent some individual conception in the mind of the conceiver, which should be applicable indifferently, and without variation, to many existing things. This opinion, if it be not all the truth, is true as far as it goes, and was, at the time, antagonist to a mischievous error. For Ockham taught also, as we have seen, negatively, that a Universal is not a substance existing external to the mind. This was the opinion of the Realists of his day. Though realism in some of its modified forms had not always necessarily implied so much. At first it was merely a protest against those who assigned to Universals only a nominal existence. It was concluded that they existed *really*;—whether in the mind or external to it, by themselves or in composition, was left as yet undecided. So if we refer to the sects of Realists mentioned by John of Salisbury, we find one division holding that the whole aggregate of individuals was the Universal. There is nothing extravagant, fanciful, mystical, or irrational in this view; it has been held very commonly by hard-headed men in our own day; it differs from that of Ockham only by the omission of a step which may easily be supplied. The two opinions

meet in the following formula—the common noun represents an individual conception which is derived from some known individuals of the class, and is applicable to them all, known and unknown. Against this form of Realism, Ockham did not put in a protest.

Neither do his arguments apply directly to the second class of Realists mentioned by John of Salisbury, who held, as he informs us, that the Individual, as containing the whole essence of the class, was, in a certain point of view, itself the Universal. This opinion was declared to be obsolete by the authority who has recorded it. It was very probably the teaching of William of Compeigne, whom Abelard prided himself on having subdued. We cannot assign it any definite value, when detached from the other opinions of those who entertained it. Thus much only we can be sure of, that it destroyed the strong and natural antithesis between Individual and Universal, by a form of speech in which they were represented as nearly, if not quite, identical. The tendency of the error would depend on circumstances. More than one authority has endeavoured to connect with the scholastic Realism the doctrine of Spinoza, that God is the one substance of which all things are modes. This is probably a mistake, but it suggests an example to our present purpose. That doctrine, always mischievous to the last degree, becomes practically either Atheism or Pantheism, according

as he who adopts it, taking his notion of substance from the world around him, degrades his conception of God to suit it: or, on the other hand, starting with some high theory of the First Being, interprets all else by it, and raises all forms of existence which meet his eye to a level which is inconsistent with sense and reason. In like manner, he who should assert that Individuals and Universals are the same, would be a most unintelligible mystic, if he took the common view of a Universal; an equally unintelligible sensualist, if he adopted the ordinary notion of an Individual.

The dominant Realism of the Schools was, as we have seen, of another kind, and regarded the Universal as a substance in some way existing in the Individual. The manner of its existence therein was, it will be remembered, the point of dispute between the Thomists and Scotists. Against either shape of the doctrine Ockham has left us little to urge. His arguments are to the point, and conclusive; and have moreover this great advantage, that he from education and familiarity most likely understood, to a degree impossible to us, the meaning of the position he aimed at overthrowing.

The remaining kind of Realism is that to which nobler minds are naturally prone, and which owes its origin to the divine Plato. That method of stating his doctrine of Ideas, in which they are regarded as existing in the mind of God, seems to admit of

an easy defence. Surely, it may be argued, if the creation was, as we know it was, orderly and regular; if the clash of circumstances did not develope the different gradations of Being out of a primitive chaos, but class after class came into existence at the bidding of the Divine Word; there can be no error in looking to that Eternal Word as the seat of Universals. These are not merely the aggregate of individuals, much less the conceptions which we have derived from them, still less that language which so imperfectly expresses thoughts imperfect in themselves; but abide rather in that unchangeable Word, from whom things, and conceptions, and language, alike proceed.

A few words on this view of the subject may be said by way of conclusion.

We may observe, in the first place, that a statement like this, however pious and true, does not amount to Realism, unless coupled with some further hypothesis. Realism requires that the Universal shall exist as a substance, in the highest category, and not merely as an attribute. So that according to the Scholastic method of treating such subjects, we must enter into the question how Ideas exist in the Divine Mind, and determine that they inhere as substances in a higher Substance, before we can be Realists indeed. And this was the opinion of most authorities, from Boëthius downward. But at present we shall

probably be of opinion, that such a question cannot be answered one way or the other, without considerable danger of carrying speculation beyond the legitimate sphere of reason.

But, waiving this objection, a further caution is necessary to those who think Realism thus congenial with their Theology. Granting that all true and genuine Universals have their seat in the Divine Mind, a further question arises—what are true and genuine Universals? Surely we cannot boldly assume, that every common term, in the present state of language, is true to its original purpose. With all our ignorance of the nature of things, all our mistaken speculations, all our conventionalities of thought and language, can we venture to think, that we have always exercised the powers of abstraction and generalization aright? And, in default of such rightful exercise, who can answer that the Universals on which we have fixed are true? Who shall say, that the classes which we have formed are in all cases grounded on the nature of things, and correspond to the intention of the Divine Author of the gradations of the universe?

We take for granted, and justly, the correctness of our own involuntary and spontaneous classification. What we do insensibly, we generally do rightly. We need not fear that we are wrong, in classing all men, or all animals, or all virtues, or all colours, or all sounds together. But when, by

a laborious effort of the mind, we endeavour to arrange these classes, which we gained without such effort, in subordination to each other; when, for instance, we would ascertain the precise relation in which the class man stands to the class animal, we cannot answer for our success. Viewed as a statement of abstract truth, if the zoological arrangement of Linnæus was right, that of Cuvier is wrong. Only when we are assured on the best evidence, that we have attained to the real order of things, and understand their relative position in the scale of creation, can we assert positively that our class terms are valid, and represent any natural Universal. To make the assumption at an earlier stage, would be, in all probability, to fix ourselves irrevocably in error.

We should begin, therefore, at any rate, in our enquiries by adopting the Conceptualist, or, as we might fairly call it, the Occamist hypothesis. We should first of all ascertain that our terms are definite, as representing some distinct mental image, and if they be so, thus far be content with them. But, this point ascertained, we come, if we prosecute our enquiry, to another doubt. How far do these conceptions, definite though they be, find their correlatives in the nature of things? What proof is there, that, when we arrange these under some wider conception, or, on the other hand, group lower classes and individuals under them, our arrangement can claim the title of

natural? Unless we can claim this dignity for it, we cannot set a high value on our class-terms. They will stand at best as symbols of a provisional classification, which greater research, or more skilful analysis, may at any moment supersede.

To begin therefore by assuming that even the most modified form of Realism is true on the existing state of things would be to begin with a mistake. It stands in this respect on a par with the scholastic system as a whole; it is a great aspiration which has never yet been verified. We may cherish it as an ideal, but as nothing more. Our knowledge is far too imperfect to allow us to assert that we class the phenomena of the world at large uniformly according to their natural classes. In some provinces of science, the work has been readily and satisfactorily accomplished. We have no hesitation in affirming that, in Mathematics, the divisions of figures according to the number of their dimensions, of lines into curved and straight, of angles into right, acute, and obtuse, of quantities in general into equal and unequal, are really natural, and give us the knowledge of natural kinds. On other subjects, as in Botany, we seem to have approximated to a true classification, though the line of demarcation between the several classes is far from being, in all cases, accurately drawn at present. Sometimes, as in the case with Zoology, it seems doubtful if the problem has been solved; sometimes, as with Mineralogy, the work still re-

mains to be accomplished; if the chrystallographic Idea be true, the arrangement of conceptions under it is quite incomplete. On the whole, we must be content to allow that the Conceptualistic view of Universals is true at present: the Realistic view, with some limitations and cautions, may be true hereafter.

CHAP. IV.

THE MODERN VIEW OF THE RELATION OF LOGIC TO SCIENCE.

THE deductive method of investigation, though theoretically the most perfect, has, when applied to most subjects, important practical defects. Its very ideal perfection destroys its actual utility. That it may be valid, there must be perfect coherence among its parts, perfect dependence on first premises. One probability, admitted, destroys the certainty of the whole; one falsehood annihilates its value. No compensating apparatus can make up for the presence of a doubt, or remedy the consequences of a single error. Even omissions, which are not positive errors, are equally fatal to its pretensions: an element of calculation, left out at the beginning, cannot be introduced afterwards. There is no provision for accommodating fresh principles when the reasoning has once begun. There may be no doubt, no retraction; all must be unhesitating progress onwards.

The scholastic system, then, might naturally be expected to fail. It was a mould far too fine and exquisite for the material to be shaped in it. Had all its premises been necessary truths, the scheme

would have been unexceptionable. Proof might have hung on proof in continual succession. But neither Aristotle nor the Fathers were infallible, either in principles or facts. Nor can the words of Scripture be taken always as expressing the literal truth on subjects not religious. We allow, for instance, the fallaciousness of the argument from Holy Writ against Galileo. The Schoolmen would have asserted its validity, as their admirers did. They over-rated in fact altogether the modality of their premises. They argued from data, which were general rules at the best, and often only probable in a low degree, and sometimes capable of being proved false by very little enquiry, as if they were absolutely true, and immutable laws of the universe. We know how rapidly the value of probabilities decreases when they are combined deductively. One fraction multiplies into another, and the thread of likelihood spreads out into the merest possibility. We soon become incapable of affixing to conclusions thus gained any practical value. The argument may serve as a clue to guide us, but not as a chain on which we can depend. If they relate to matters of experience, we call in observation or experiment to confirm them; if they cannot be so verified, we corroborate them by analogy, or example, or some other such compendious aid to proof. If these fail us, we must leave them without assigning them any importance, till they are proved or disproved by some

process of reasoning less high in its character than the deductive, but better suited to the matter in hand.

The fate of the scholastic Philosophy may serve to illustrate these remarks. Boldly did it proceed at first, ramifying in all directions in dependence on its central trunk. Descending by degrees from broad Universals and elevated speculations, it came at length to the region of practical truth. And here the great mental defect of the Schoolmen betrayed itself. Their perceptive powers were quite sacrificed to the reflective. They neither used observation on the creatures of the world without, nor employed imagination in creating a new world within. Therefore they seem to have reasoned and written mechanically, and without any object external to the process of reasoning or writing itself. It would be hard to say at what their Philosophy aims, except its own completeness. When consequently in their course they came to the line which marked the sphere of actual life and conduct, no instinct bade them stop. They traversed the level of ordinary thought without heed or remark, only to descend below it. A few steps sufficed for the passage from a question as to the nature of the Divine understanding, or the laws which limit the operations of God, to a discussion of some minute metaphysical question, or the discovery in some ordinary word of some half dozen senses, which none but a master-schoolman

could then devise, and which now, without some pupillage, it is very difficult to follow.

Accordingly, the predominant feeling of the Schoolmen turned them away from the region of Physic, which leaves least room for mere dwelling upon terms, without affixing to them a meaning. Aristotle's works on this subject as on others met indeed with their share of comment. But deductions from his principles would have been apt to bring a speculator full tilt against some obvious and opposing fact, which would have pierced his thin and airy system, and caused it in a moment to collapse. Hence arose the necessity of avoiding this delicate ground, and either neglecting Physic altogether, or running it up into metaphysical questions about the nature, for instance, of the principles of motion or causation, or the distinction of matter and form. Those Schoolmen who had the strongest physical turn seem aliens from their brethren. Roger Bacon ranks with them in little beside date. And the vast learning of Albertus Magnus has had small influence on the world, when compared with the acute and systematic deductions of his great pupil Aquinas.

Thus the ultimate fortune of scholasticism differed according to its subject. It naturally failed first, when the independent observation of facts caused its truth to be tested. Such discoveries as those of Galileo with regard to the falsity of the once-received laws of motion involved

the system in disgrace. Consequences could not be trusted where premises were so false; and when one set of premises had signally given way, little confidence could be placed on any other which rested on like authority.

Botany again, which, as connected with Medicine, was all along of great practical importance, and which, to be cultivated with any reasonable hope of success, evidently demands the attention of the student not only to descriptions of plants but to the plants themselves, was one of the first subjects on which enquirers, laying aside useless comments on Theophrastus and other authorities, betook themselves, first of all, to the study of facts, and those gained, to their classification and arrangement.

So on a third and more important topic; the Schoolmen had fashioned Theology after their own mind, and incorporated with it their own views of Church authority, and a characteristic doctrine of the Sacraments. These were something more than speculative opinions; and these too received a heavy blow at the Reformation.

But, in Morals and Metaphysic, and Method in general, as distinct from its application, their system long lasted on, to a great degree unquestionable. Ultimately it sank into neglect only on account of its evident unprofitableness. It expatiated at its own pleasure, and sufficiently widely to prove itself nugatory. Or, like a force expend-

ing itself in a vacuum, it met with nothing on which to act, and was therefore of no calculable value. The walls and bulwarks stood entire, but they were also undefended; the city was deserted by its old inhabitants, and the enemy thought demolition unnecessary labour^a.

The endeavour then to work out the Aristotelian idea of Wisdom had failed. Philosophy had made the effort, and, now that its ill success was evident, seemed dispirited and remiss, unable to be satisfied with the result of its labours, and yet with no heart to begin them anew. She needed some novel Idea to stimulate her exertions, to give a fresh interest to her old field of speculation, and serve as a clue in her resumed researches. Such an Idea was given by the virtual father of modern philosophy, Lord Bacon.

His work was in many respects closely like that of Aristotle. Neither the author of the old or of

^a It is curious to see, how, in many cases, the old form remained when the substance was departed—how, for instance, Sanderson, having treated at length of the Predicaments in the earlier parts of his *Logic*, gives, towards its close, as examples of a popular arrangement of common-places, the distribution of facts under either the ten Categories, or the ten Commandments. (Append. Post. ch. iii. §. 6.): how Gwillim, heraldically faithful to the past, portions out his "charges" according to the division of the category of substance which he found in the *Logic* of his school-days, (Sec. iii. ad init.); and Divines, as late as the Savoy Conference, thought it worth while to throw arguments in actual disputation, and not in mere school exercises, into the strict dialectic form. (Cardwell, *Hist. of Conferences*, p. 364.)

the new Organon elaborated the system of which he was to bear the honours hereafter. Each proposed an Idea, which was left for others to adopt and perfect. The collections of each in the way of facts and materials were comparatively worthless. They were great generals, the labour of whose hands was of little importance when compared to the weight of their commands. Each displayed that boldness which is one of the surest auguries of success; and, in his day, called the attention of all, with a confidence which created confidence in its turn, to his own Idea of Perfect Science.

Nor was the form which this Idea assumed on the respective minds of these great thinkers so different as we are apt at first to imagine. Lord Bacon does not seem to have thought less highly of the possible results of scientific research than Aristotle. They both looked to the absolute unity of all knowledge as its state of ideal perfection, without declaring positively whether they thought such state attainable or not. They both thought that Philosophy would find its fulfilment in the subordination and arrangement of many truths under one. They differed mainly in the method by which they thought this subordination and arrangement was to be attained. They adopted each his own mode and order of investigation, while they looked to the end of investigation as one and the same.

The Aristotelians (perhaps it is safer and fairer here to speak of the pupils than of the master) made, as we have seen, the Many depend upon the One. They took that order of Science, which, though it be that of the Divine Mind, is one which requires more perfect discernment and accuracy in its application to general subjects than we can command. One metaphor seems to have been continually before their minds, most suitable to the whole aspect of their system, and recommended to Christians still more by its use in Holy Writ—that of the Tree of Knowledge. All the ramifications of Truth were supported actually by its single trunk, as they had been contained virtually in the idea of Being, its seed. Descartes (a man of such genius that we the more regret the accusations of plagiarism from the Schoolmen, and from every other accessible source, which are continually brought against him) draws out the figure rather happily. “The whole of Philosophy,” he tells us, “is as a tree whose roots are Metaphysic, whose trunk is Physic, whose boughs shooting forth therefrom are all the other sciences, which reduce on the whole to the three principal heads of Medicine, Mechanic, and Ethic—I mean that most exalted and perfect Discipline of Manners, which presupposes the perfect knowledge of other sciences, and is therefore the last and highest grade of Wisdom. Just then as fruits are gathered neither from the roots of trees nor from the trunk, but only from the end of the boughs; so the chief

use of Philosophy lies in those parts of it which are necessarily the last to be learned^b.”

Appropriate as this figure is, expressing not only the form and configuration, but the natural development and inward growth of a philosophical system, the fact could not at last be denied, that the scholastic tree was withered, if not dead; stretching forth bare boughs through the heavens, and fixed, not by roots, but by its sheer bulk and ponderosity.

Lord Bacon at once inverted the method, and supplanted the metaphor. Just as Copernicus, when he perceived the endless complexity involved in the supposition that the sun moved round the earth, tried, and successfully, to attain a simpler expression of the facts of Astronomy by supposing the earth to move round the sun: just as, in later times, and with far more doubtful success, Kant, acting on this earlier example, endeavoured to reduce Metaphysic to a similar basis, by making our conceptions determine phenomena, and not, as had been previously assumed, phenomena determine our conceptions; so Lord Bacon, standing between the two thinkers both in time and in intellectual position, with a keen perception of either kind of truth, curious both in facts and laws, in Physic and in Metaphysic, ventured on the experiment, from which so much good has resulted, of in-

^b *Praefat. ad Principia Philosophiae.*

verting, while he preserved, the old Idea of Science; still holding a belief in its possible ultimate reduction to a single head, insisting on the necessity of its unity and order, but building up the unity on the plurality, not deducing the plurality as a consequence from the unity.

Accordingly, the figure by which he represented the whole sum of Science was not a tree, but a Pyramid. On this he insists in the well-known passage which occurs both in the Advancement of Learning and in the corresponding part of his great Latin work. "It is the duty," he reminds us, "and virtue of all knowledge to abridge the infinity of individual experience, as much as the conception of truth will permit; and to remedy the complaint of *vita brevis, ars longa*: which is performed by uniting the notions and conceptions of Sciences; for knowledges are as pyramids whereof history is the basis. So, of Natural Philosophy, the basis is Natural History, the stage next the basis is Physic, the stage next the vertical point is Metaphysic. As for the vertical point, *opus quod operatur Deus a principio usque ad finem*, we know not whether man's agency can attain unto it. But these three be the true stages of knowledge, and are to them that are depraved, no better than the giants' hills,

'Ter sunt conati imponere Pelio Ossam

Scilicet, atque Ossæ frondosum involvere Olympum.'

But to those which refer all things to the Glory of

God, they are as the three acclamations, 'Sancte, Sancte, Sancte;' holy in the description or dilatation of His works, holy in the connection or concatenation of them, and holy in the union of them in a perpetual and uniform law."

According to this view, also, it will be seen, the culminating point of Science is Theology. The difference is not in position, but in order; though first in nature, it is last arrived at. So in another passage, highly illustrative of the manner in which he makes the fables of the ancients speak more than their inventors meant, he expressly teaches. "Horns," he tells us, "are attributed by the ancients to Pan, or the Universe, broad at the base, but tapering to a point. For the whole nature of things is pointed like a Pyramid. The individuals, over which the base of nature extends, are infinite; these are collected into species, themselves also numerous; the species again rise into genera; and these too again contract into classes still more general, till all nature at last seems to unite in one: which is indicated by the pyramidal figure of the horns of Pan. And no wonder that his horns strike the very heavens. For the lofty things of nature, or universal forms, in some sense touch on Divinity. And therefore that famous chain of Homer (the chain, that is, of natural causes) was said to be fixed to the foot of Jupiter's throne. And no one (as may be seen) has treated of Metaphysic and the eternal and immutable

truths of nature, withdrawing his mind for a time from the flux of things, without at the same time touching on Natural Theology; so ready and natural is the passage from the vertex of the pyramid to things divine^c."

This was the new turn which Lord Bacon gave to Philosophy. Science appeared to him more material, and less formal, than it had seemed to his predecessors. They had regarded their method as something like a principle of life, which superseded the ordinary conditions of inanimate nature, and enabled them to widen out their knowledge, as it were, from the basis upwards. Just as organization brings about results which cannot chemically be accounted for; just as the law of crystallization seems for a time to suspend the operation of the laws of gravity; so it appeared to them that the conditions of thought could control and regulate the conditions of Being. Reasoning was something more than the scaffold by means of which the building was erected: it was part of the building itself.

The fabric of knowledge presented itself to Lord Bacon in a different light. He thought that the tendency of former times had been to overrate the powers of reason. His apprehension was, that the lawful construction of a Science might be sacrificed to the love of method and consistency. He reminds his reader that "it is natural for the

^c De Augm. Scientiarum, lib. ii. ad. init.

mind of man readily to imagine greater order and equality in nature than it finds there^d;" that it "needs not the addition of wings, but rather a burden as of lead, to bar all leaping and flying^e." He allowed no power to the intellect of anticipating observation and experiment. The instruments of Science, he thought, had hitherto corrupted Science itself. Plato had spoiled it with Theology, Aristotle with Logic, Proclus with Mathematics^f. So he proposed to make knowledge a congeries of facts, which like a pyramid would hold together by the natural force of cohesion. None of the apparatus employed in raising it was ultimately to be incorporated with it. Induction was to become a great engine, which all could work, and all with equal success. His method of investigation was to equalize all intellects^g, and this on every subject: for, he tells us, "as vulgar Logic, which governs its subjects by syllogism, pertains to all Sciences, and not to physical Science only; so likewise our Logic, which proceeds by induction, embraces all^h."

There is always a danger of riding a metaphor to death, especially when it is so natural and true, as to combine itself with the direct argument, and become undistinguishable from it. Perhaps Lord Bacon has been guilty of this mistake, not an uncommon one with rapid and powerful minds, to

^d Nov. Org. lib. i. §. 45.

^e Ib. §. 104.

^f Ib. §. 96.

^g Ib. §. 122.

^h Ib. §. 127.

whom it does not occur that their own energy of thought may have found but an insufficient exponent, and that the tired Pegasus may cease to answer to the spur. The thorough adoption of this pyramidal theory of knowledge implies a great assumption—nothing less than this, that while the order and arrangement, which the facts of Science fall into, is really essential; that dependence and consequence, that necessary connection among them, which the mind can in some cases trace, and is eager to trace in all, is not essential. It implies, what, to say the least, has never yet been established, that the Idea of a Science, the nucleus around which all its facts cluster, the principle of that unity which Lord Bacon himself insisted upon, is itself merely a generalized fact, true in no other and in no higher sense than the phenomena which fall under it. Thus reason is lowered unnecessarily, and deposed from the throne which observation is unfit to occupy. The Schoolmen had thought to move the world without a fulcrum for their intellectual lever: Lord Bacon doubted the lever's strength, even were the fulcrum given.

We need scarcely remark, that neither idea of Science has prevailed exclusively since his time. Men have not been every where labouring like Egyptian slaves at perfecting the pyramid of Truth by the mechanical application of the engine called Induction. Deduction is still extant in the world,

and shows signs of vigorous life. Intellect, in spite of all its idols, is still in request. There is no immediate probability that any organon will succeed in obliterating the practical distinction between ordinary and extraordinary minds. Modern Science is content to aim at that unity which both the Schoolmen and Lord Bacon sought, by the method of either indifferently. The subject on which it is engaged determines whether it shall follow out the idea to its consequences, or arrange phenomena under an idea. In one respect, we are less hopeful now, than the sage of Verulam was. We do not hesitate to pronounce the absolute unity of all knowledge impossible to the human mind. Far less is it thought, that the formal unity of Logic is at all equivalent to a real unity of Science. Logic, as we shall presently see, is held indeed to stand in a slightly different relation to induction and deduction; but in neither case is it supposed to give both matter and form, or so to extend form, as to enable us to dispense with matter. Its monarchy is now more sure, because limited. From being, in turn, a part of Philosophy, and the whole, it has descended to the level of an instrument.

CHAP. V.

ON THE DIFFERENT MODERN SCHOOLS OF LOGIC.

Logic, then, it is now generally allowed, is only an instrument of Philosophy—an instrument as contrasted with a part; not involved in the idea, or necessarily bound up in its existence; not even an universal preliminary of Science, though it may be indispensable to some minds, and highly useful to all. Enough will be granted to show its importance, if it be admitted, that scientific research, and scientific statement, become more easy by its means; enough also to attach interest to the question, which we will now proceed to discuss—*how* does Logic prove itself to be thus instrumental to Philosophy?

The correct answer to this enquiry is also the obvious one. Philosophy, it is answered, is elaborated by the mind of man; and correctness of process is an ordinary though not an invariable condition of correctness of result. It is by regulating thought, or the act of the rational mind, that Logic is instrumental to its end. It gives neither facts, nor ideas under which to combine them; but by its analysis of the mental operations,

it enables us to test the correctness of the combinations of phenomena, the conclusiveness of the consequences from an idea.

There is however more than one school of thinkers, who regard Metaphysic (using that word in the sense of a science of thought) as impossible; or at least as doubtful, and deceptive, and a fair object of suspicion. These, while they allow the utility of Logic, prefer accounting for it in another way than that mentioned above. Unwilling to speak of it as conversant with thought, or conceptions, or inference, or mental operations in general, they assert broadly that Logic deals either with words, or with things.

Thus Logicians, at the very entry of their subject, begin to differ. They cannot agree in stating with what they have to deal. The difference among them is sometimes real, sometimes only verbal; but, even where it is verbal, it is sufficient to prove a broad separation of tone in the contending parties. The point at controversy needs some explanation; and, for convenience sake, a name which involves no reproach may be given to the advocates of the several opinions. We will then divide Logicians into three schools, according as they hold words, things, or conceptions, to be the subject of Logic; and entitle them respectively, the verbal, the phenomenal, and the conceptional.

These divisions find no exact counterpart in ancient or mediæval Logic. The connection of

thing, conception, and word, was at first much more dwelt on than their antithesis. The disputes as to the origin of language did not materially affect the question. Even those who, like Aristotle, derived it from convention, admitted this fundamental parallelism. They assumed, as perhaps it were wiser for us to assume, that our mental impressions adequately represent the outward world; that our language does sufficient justice to these mental impressions. To decide in which the province of Logic properly lay, was not a point of practical importance. The regulation of either portion of the realm would involve also the proportionate adjustment of the other.

Neither again can the question slide back, as it sometimes seems inclined to do, with that of Nominalism, Realism, and Conceptualism. Though some of the verbal school are, as we shall see, the legitimate successors of the ancient Nominalists, they should not be confounded with them. Members of the three schools may be perfectly agreed in their view of Universals. Besides, the dispute is not, like that of old, really extra-logical. How Logic furthers Science, is a question which may be entertained without trenching on Metaphysic; not so the other query—what it is that common nouns signify.

Proceed we then to consider the respective claims of these rival views to our regard. That the conceptional opinion is on the whole correct,

will be best shown by our notice of the errors with which it is contrasted. Our first remarks shall be devoted to the *verbal* School.

Those who assert, that the regulation of Language is the province of Logic, may be guilty only of an awkward method of stating a truth. They may not intend more than to insist on the intimate connection between Language and Thought. Every act of thought, they urge, and truly, is accompanied, and figured to the mind, by some word, external or internal. Thinking, as naturally seeks its expression in language, as feeling does in inarticulate sound. The relation of the sign to the thing signified is in each case the same; though the one is the exponent of the act of the rational soul, the other of the irrational. Just as brutes express pain spontaneously, by uneasy motion, or their natural cries, so men spontaneously invest their conceptions with an outward clothing. That the word is not always articulated, matters not; enough, if it be understood. In all probability, however, were nature left to run wild, we should think aloud for the most part, and make no more secret of our thoughts, than children, before the time of definite reflection, do of their feelings. It is different in society: an instinct, easily developed, teaches us, that to utter all that is conceived would be unwise, as to give vent to all that is felt, would be unmanly.

All this is true: but it does not nearly amount

to a proof that Logic must subserve to Science only by regulating language. Such regulation is the work not of Logic, but of Grammar. Grammar looks to clearness of expression, as Logic to clearness of conception. We may have logical accuracy without grammatical. This is often the case with reflective persons who have lived much alone. They think methodically and correctly, but fail in the attempt to communicate their meaning. And if the endeavour to express one's thoughts often shows their indistinctness, it does not follow that the means which expose the defect, will also serve as the remedy.

But, it may be urged in reply, though accuracy of thought be really the aim of Logic, this is practically identical with accuracy of language. For it is only through language that thoughts can be transmitted from one mind to another. Thus, it is argued, the necessary medium becomes, for ordinary uses, identical with that which it conveys.

Here, however, there is twofold fallacy. In the first place, though language be essential to thought, it does not follow that accuracy of thought will always be attended with grammatical accuracy of language. In fact, it is not found to be so: an idea may be, and often is, expressed in a calculus far less elevated than itself. Mind overtasks its machinery of words, and in so doing, injures it. The servant suffers in the endeavour to do justice

to his master. Thus strict thought is found unfavourable to the perfection of speech; it wears away a language, just as intense mental action wears away the body; it decomposes it, so to speak, breaking off its inflections, and substituting particles in their stead; its expressions often only escape from being positively ungrammatical, by declaring their independence of the rules of Grammar altogether. So Mathematics have their own verb of equality, their own substantives of number, nullity, and infinity, their own prepositions of addition, subtraction, multiplication, and division, the use of which they regulate on principles of their own. So again all professional idioms and vocabularies are by common consent pronounced inelegant and awkward. Even the process of stating an argument syllogistically, or of converting a proposition, involves the necessity, for the most part, of verbal anomalies. Who can blame the Schoolmen for inexactness in the details of thought? Yet who like them ever frittered away, even to utter annihilation, the expression, and genius, and, in a great measure, the grammatical structure of a language?

Secondly, it should be observed, that Logic, to be useful, does not necessarily imply the contact of one mind with another. It may be, and often has been, used as an instrument of self-education. Two disputants need an elaboration of vocabulary, which the solitary thinker may dis-

pense with. Dialectic is not synonymous with Analytic, nor Eristic with Logic.

In fine: when we speak of Logic as teaching the accurate use of Language, two different things may be meant. It may be asserted, either that Logic arranges the parts of speech accurately with regard to one another, or that it so orders them, as that they shall correspond duly with the process of thought. The former of these positions would have few supporters, amounting as it does to an absolute fusion of Logic and Grammar. The latter, while it asserts the separate existence of thought and language, allows also, that the language is subservient to the thought; that the conception is final, where the word is instrumental. Is it not then better to fix on thought as the subject of Logic, than on that which only comes under consideration as its vehicle and exponent?

It is much to be regretted, that so many symptoms of an adhesion to the opinions of this moderate section of the verbal School are to be found in the able treatise of Archbishop Whately. His definition of Logic, as "the Art of employing Language properly for the purpose of Reasoning," is conceived quite in this spirit. To trace this evil tendency in detail through his work would be quite foreign to our present purpose. Two of its more general features may however be mentioned here, as illustrative of the turn of mind with which this logical theory is associated. In the first

place, he is led to attach far too much importance to the mere arrangement of words, and to measure the elasticity and pliability of thought by that of the raw material out of which its finished representations are fabricated. The most striking instance of this defect is found in his way of treating hypothetical and inductive arguments. He compels methods of reasoning, which, when viewed in the thinking mind, are clearly distinct from the deductive process and from each other, to bow to an artifice of language, and submit to the one unvarying formula of syllogism. And, secondly, he shows a continual disposition to underrate the number of real questions at issue among mankind, and to increase in proportion the number of merely verbal differences. His common way of dealing with contending disputants is to accuse them of an equivocation; to assure them, that they either mean the same thing by different words, or use the same word to signify distinct things. Or, if this plan will not succeed, he looks for some formal error in the argument of one of the parties; and is ready to assign the discrepancy to any cause except that which is probably the real one—some broad difference of principle underlying the whole discussion, and forcing, as it were, the superficial strata of thought from what would be else their level and unbroken direction. This is in fact to assume that men can

with equal ease be made to be of one mind and of one vocabulary.

The truth is, that the minds of men differ in natural constitution as widely as their bodies. As we do not all spontaneously move our limbs in the same manner, so neither do we think alike. When discipline makes men uniform and simultaneous in their motions, it only suspends their natural peculiarities, and does not destroy them. Though the effect of the drill-sergeant's labours may be observable when the soldier is off parade, they no longer produce an exact uniformity. Those differences of gait and bearing then display themselves once more, which at the time seemed obliterated.

So it is with Thought. The clever arguer drills, so to speak, the mind of those who follow him. By a sympathy, voluntary or involuntary, as the case may be, they throw themselves into the same mental posture with their coryphæus. Slowly, with reluctance perhaps, and difficulty, minds from different regions of thought tend to the same point, under the guidance, and by the attraction, of a more powerful mind, and acquiesce in a formula. It seems for the moment as if they were really agreed. They cease to quarrel, while they stand side by side in formal precision on the platform of definition and syllogism. Yet, remove the restraints of system, and they relapse into

individuality. They return to their own points of view again, and choose their own classifications and divisions. This implies as real a distinction between their opinions, as a difference on matters of fact. Indeed their conflicting impressions as to facts are more easily removable by testimony, and evidence, and renewed observation, than their diversities of theory. Here idiosyncrasies come into play; and Nature, which has been expelled for the time by a logical bifurcation, returns.

It is therefore at best a short-sighted wisdom, to exaggerate the power of Language in producing agreement and correctness of Thought. We cannot narrow the interval between the act of the mind and its symbol. The clever logician indeed, who has formed his own opinions, may state them in a definite form of words, and find this form very generally, though not very willingly, accepted. He may thence argue, that others for the most part differ from him only in consequence of the absence of formal statement, and that, were their views as distinctly stated as his own, the very shadow of dispute would vanish. The delusion might last, till men, from stating their opinions, came to act upon them. It would then be seen, that those who adopt a formula on intellectual compulsion, reserve to themselves the liberty of interpreting it. The history of nations and of philosophies shows this truth more clearly than that of individual minds. What nice forms of words can apprehend and per-

petuate the leading idea of a school, or the constitution of a polity? The nomenclature and outward form of a system or a state may remain comparatively unchanged, when its inner life is completely altered.

We have hitherto dwelt on what seems rather a tendency to error than a positive violation of the truth. But there is no reason for holding back the most decisive condemnation of the extreme party of the same school, who deny altogether the antithesis between language and thought, and thus make every question *purely verbal*.

The three best known supporters of this doctrine are Hobbes, Horne Tooke, and Condillac. Of these, Hobbes seems to have struck out the opinion for himself in the wanton exercise of his usual perverse ingenuity. But Horne Tooke and Condillac, though later in point of time, were not directly indebted to his teaching. Their conclusions were, as they thought, perhaps rightly, a fair inference from the doctrines of Locke. This is one of many instances, in which opinions have, so to speak, filtered through a system without being incorporated with it: for Locke, though a student of Hobbes, never himself adopted those opinions from him, which he unintentionally communicated to others. It was his lot to transmit the infection, without suffering from it himself.

This erring triad, while they agree in theory, differ somewhat in the subject to which they apply

it. Hobbes throws his remarks into a form directly bearing on our purpose. Logic is with him "the Art of Computation"—simply a peculiar kind of mental arithmetic. "Logicians," he would have us think, "add together two names, to make an affirmation, and two affirmations to make a syllogism, and many syllogisms to make a demonstration; and from the sum, or conclusion, of a syllogism, they subtract one proposition to find the other^a." And this is not meant to describe an accident of the ratiocinative process, but its very substance. For "Reason," he further tells us, "is nothing but reckoning (that is, adding and subtracting) of the consequences of general names agreed upon, for the marking and signifying of our thoughts^a." Horne Tooke takes the grammatical turn, and speaks principally of the nature of terms. It is these, he says^b, which are simple or complex, general or abstract, and not the ideas which they signify. While Condillac makes his view more a part of a metaphysical system, and in connection with it goes into the wide question of the origin of human knowledge. We are familiar with his pointed saying, that "Science is only a well-assorted language."

The difficulty of coping with this error on grounds of pure theory, lies mainly in the impossibility of really grasping its meaning. While at first sight it appears an intelligible though paradoxical

^a Leviathan, ch. v.

^b Div. of Purley, p. i. ch. 2.

proposition to assert that language and thought are identical, yet, on the endeavour to apprehend and handle it, it degenerates into simple nonsense. The quotation, for instance, from the "Merry Wives of Windsor," which Horne Tooke approves and adopts, that "the lip is parcel of the mind," is most expressive as a metaphor, but absolutely unmeaning as a philosophical statement. We should be ill-employed in the endeavour to give it a sense which does not belong to it. It would be a mischievous if not a vain attempt thus to make error substantive. It will be better to devote some space to the consideration, not of itself, but of its results, and of the principles with which it is associated.

This verbal philosophy, then, has a close, and sometimes an avowed, connection with materialism. Its founder, Hobbes, denied altogether the distinction between mind and matter; and the sensualism of Locke has been usually supposed to tend in the same direction. Thus to confuse word and thought leads of course to the theoretical annihilation of the latter. It becomes a consequence of our bodily organization, the laws of which it must necessarily follow.

Thus it leads from the lowest view of human knowledge, to the lowest view of human nature in general also. If thought be only a function of language, man is better characterized as a speaking

^c Act. i. se. iv.

than as a reasoning being. For it is more natural and more scientific to define by the cause than the effect. And then, to draw any such inference from man's possessing reason, as that his actions are therefore probably free, or his thinking nature immortal, becomes at once absurd. For none will assert such liberty or immortality to be a consequence of speech, of which reason itself is on this theory a consequence. Lips and tongue obey universally physical laws, and are subject to physical decay. But how can the thought be permanent, when that from which all thought originates, and of which it is a form, is no more?

Indeed, the opinions on general subjects, to which the verbal school of Logic naturally leads, are equally narrow and absurd. Built upon a fundamental proposition which is in the strict sense of the word *insignificant*, they resemble one of those perspectives, which are distorted and irregular to the eye of the beholder, who regards them from any but one given position. To understand them at all, the connection of thought with language, which is part of the truth, must be accepted as a whole. Thus a wrong-headed consistency, a fallacious unity of idea, marks the whole system, and the writings of those who support it. It is liable to nearly all the objections which tell against the Schoolmen, and to many more. It is as exclusive, as dogmatic, as consequential, and, from the insecurity of its basis, as

unsound. We are apt to overlook the connection between the scholastic and the verbal method, because they are employed for purposes so very different, because the advocates of the latter vehemently opposed the supporters of the former, and were as ready to destroy as those had been to construct. Both however agree in asserting the practical control of language over truth. The Schoolmen erred in supposing that Science could be attained by a judicious use of their vocabulary in the processes of defining and deducing. They expected too much from their instruments, which they exalted to the level of that of which they treated; the verbal philosophers, esteeming their great tool less highly, have another way of making it equal to its work. Instead of making language wide as truth, they pare down and narrow the truth that it may be containable within the limits of language. The one argued, "this follows from the force of terms; therefore it is true;" the others, "this does not follow from the laws of language, therefore it is not true:" the former mode of thought is right in itself, though not necessarily in its application; the latter is false as a proposition, and dangerous as a premise. The formula, however, does not unfairly represent the verbal school, who are ever involved, if in nothing worse, in that mean and odious form of error which arises from an unwillingness to apprehend first truths, who meet their adversaries' attempts at proof, only by de-

claring that which they would prove impossible, and while the rest of the world is resolutely bent on asserting, glory in the obstinacy of denial.

Enough has been now said of these arch-heretics in the first Philosophy, who hold the same place with regard to Logic that atheists do to Religion, assuming the identity of cause and effect to escape the difficulty of tracing their connection, and obtaining great clearness, it may be, though not depth, in their speculations, at the expense of positing an overwhelmingly absurd paradox as the basis of them all. We will now pass to the phenomenal school of Logicians, premising some remarks, which may cast light on its tendencies and sympathies.

Authors of formal systems, and especially those who exemplify them by applying them to particular subjects, may be divided into two classes, which we may be allowed to call the Historical, and the Prophetical. They either trace the part which a given Idea has played in some great work already accomplished, or feel that they themselves have a great work to do. They employ some truth, which they consider to be eternal, either in the explanation of what is already past, or the development of what is yet to be.

The second of these classes, for many reasons, exercises the greater influence over the mass of men. They unite in their writings two elements, which are often separated—the gratification both of practical, and of speculative curiosity. The very

form of their speculations is for the most part pleasing; it throws itself into the ideal world, and gives us pictures of an imaginary state of Social Life, or Science, or Art. Hence we have the Republic of Plato, the new Atlantis of Bacon, the Wilhelm Meister of Göthe. And this imaginative impulse implies a bold confidence on the part of the speculators in their own powers, which excites a corresponding confidence in those who follow them.

On the other hand, there is a comparative lack of interest about the procedure of those, who dwell mainly on the causes of the past. It is a lower office to discover the reason of a known fact, than to deduce independently a fact before unknown from *a priori* considerations of its reasons. The mass of men are so apt to gain their conclusions first, and their premises afterwards, that they suspect any like conduct on the part of those who should be their guides, as proceeding from the same false confidence in their actions and wishes, and the same want of confidence in their motives, which they cannot help detecting in themselves. So we find practically less results from the labours of these historical thinkers. Aristotle has only proved so great in his power over mankind by having his system impregnated with a spirit most alien to his own; while the soul of Plato has at least thrice since his own time lighted up the pile of his glorious philosophy. For a similar reason apolo-

getic treatises weigh not so much with men as those which act on the offensive. The positive views which they imply are for the most part their real attraction. It is when Hooker most charms, that we least think of Cartwright. So again physical researches are to most minds more pleasing and attractive than moral, because they render the discovery of other phenomena probable, as well as account for those already known. A discussion of the theory of Virtue could only re-arrange old facts; whereas a theory of Light not only attempts this problem, but serves as a guide in fresh experiments which are meant to issue in new discoveries. One reason why Casuistry has been despised as well as hated is, because it sometimes attempts to state, as deductions of reason, propositions which a healthy mind rules by an intuitive decision. In like manner the endeavour which some logicians have made to prove by reasoning truths which we know without reasoning, such as the laws of Opposition, has re-acted to their own discredit.

It will be found that the more successful school of theorists flourishes most in times which seem disastrous to other learning. Philosophical anarchy affords them the greatest scope, if they have genius equal to the emergency. Like patriots, who rise to save their country, the miserable posture of things around them kindles their hopes and their enthusiasm. There can be no doubt what is to be

done; how, is the only question. Popular support too they can make more easily their own; the prospect of change is more agreeable, when existing circumstances have so little to encourage. Thus Plato rose when the errors of the sophists had spread to their widest extent, and were now beating themselves into foam upon the shores of thought; Lord Bacon constructed his Inductive scheme when men were becoming sensible of the absence of all sound philosophy; Locke wrote the more confidently, because he felt he was dealing the death-blow to an already dying system of Metaphysic; and Berkeley, seeing the feeble character of the scepticism which had originated from materialist views, aimed his attack against the very existence of matter. An error, which has been nearly universal, and is showing general symptoms of decay, affords the readiest opening for the advancement of Truth.

On the other hand, general theories traverse a more restricted circle, and in a more cautious manner, when particular branches of knowledge are expanding, readily, rapidly, and certainly. There seems less occasion for novel speculations, however ingenious and acute, when all is going on well without them. Original considerations of method, it appears, may be safely neglected, when the old plan is working effectually. At any rate, Logic and other formal systems come in this case less prominently forward, and adopt a self-depre-

ciating tone, do not attempt to innovate, but are content to follow; assume the historical, not the prophetic aspect, and, like humble panegyrists, identify themselves, as much as is possible without pretending to equal them, with the different courses of investigation of which they commemorate the triumph.

Perhaps we may thus account for some of the least desirable peculiarities of Mr. Mill's able "System of Logic." It implies a submission and concession on the part of formal science; a surrender at will, so to speak, of Metaphysic to Physic. The favourite notions of Logic are transferred from the inner to the outward world; sequence, causation, and the like, are held to be derived from phenomena, and not to be conditions of our perceiving them. The same temper of mind extends further, and influences the view taken, not only of the manner in which Logic regards its subjects; but of the subject with which Logic is really conversant. To represent it as dealing with conceptions, would seem, in this view, to invest it with too much metaphysical dignity; to make it sovereign, not subsidiary; and independent in a province of its own. Accordingly, it is considered more safe and practical to regard it, and, with it, other sciences, as having to do with *things*. So words are considered as signs, rather of things, than of our conceptions of them^d; and in the same spirit it is urged,

^d Vol. i. p. 28.

that the theory which regards a proposition as the union of two ideas or conceptions, and not of two things, is, when taken by itself, most meagre and unsatisfactory*.

This view of Logic recommends itself to practical persons who are not logicians, and have no wish to become so, if for no other reason, at least for this, that it lowers her pretensions in the greatest possible degree, and leaves her the merest shadow of importance. If we adopt it, Logic at once appears to have no peculiar principles, no proper work of her own. She is the slave, rather than the minister, of Science, with just enough independent reason to do as she is bidden, but with by no means enough to assert any collateral authority. Being in her nature wholly *à posteriori*, and dependent on phenomena, it is they which really give her laws, not she which fixes their value.

In the mind of more abstract thinkers, the same view connects itself closely with a doubt, if not disbelief, in the possibility of Metaphysic, or the Science of Mind. It enables them to throw Logic into a more external and objective form; to put out of sight, for the time, all the difficulties which arise from the consideration of our thinking nature, and to make the student lean in confidence on the facts of the outward world.

The difference, however, between this and the conceptional theory is but verbal; and the relief

* Vol. i. p. 117.

which it gives to the student is the result of an artifice of language, and can therefore be of but temporary avail. Logic cannot deal with things as contrasted with conceptions, though it can with things as confused with them. In its most objective aspect it is conversant with *phenomena*, that is, with things as they appear to us, not as they are in themselves. This is quite enough to admit the whole sea of doubts which are associated with such questions as that of the existence of matter and the nature of our perceptions. So, to say that in a proposition we mentally unite two things, (and of course a mental union only is possible) is to say by implication that we unite our conceptions of them. With due qualifications, the two opposed statements melt into one.

The phenomenal School of Thought, though liable to grave objections, holds a higher place in intellectual dignity than the verbal. The latter, without any real devotion to Physic, is, as we have seen, of a materialistic cast; the former need not incline to Materialism, while its tendency to further physical knowledge is undeniable. To assert Truth to lie merely in language, is a step toward denying its existence. But to the reality of the truths of the outward world, the phenomenal School begins by pledging itself. On these it fixes its attention, observes their laws, and extracts its system from them. And in dwelling on them it may steer clear of all Materialism, because

it regards them as lying, so to speak, at the in-osculation of man and the Universe; as being facts of our perception, into the nature of which perception it does not profess to enter. This is so far a merit; but from the same source with this merit flow great defects also. If its canon of investigation were adopted, it would enlarge our knowledge in one direction only. The facts of consciousness it declines analysing, though it does not object to combining them; and the absence of such analysis renders it, however at home it may be in Inductive Science, a most incompetent and unsafe guide in Deduction, or in the border-territories of Morals and Art. For in treating of each of these, there is a subjective element which demands consideration. The fundamental Ideas of Deductive Science are something more than mere abstractions from the phenomena which are grouped under them, and none of which in themselves adequately embody them. So again Moral truth, if it is to stand in contrast with Physical, implies the positing of an Idea which does not conform to the laws of external experience—that of the free will. And that theory of Art, which would banish its intellectual aspect, and place its perfection in imitation and execution only, is far too imperfect and unsatisfactory, to recommend itself either to the artist or the philosopher.

Religion, too, it is to be feared, is a subject necessarily undreamt of in this Philosophy. Theo-

logy rests, if not on the notion of a Mediator, at least on that of mediation—a connection between ourselves and God. Mere contemplation of the highest form of excellence avails not, except it be accompanied by a fashioning, which with man must always be a conscious fashioning, of the contemplator, to the model of that which he contemplates. An entire resting on the outward would be only good, were it possible, where the inward is perfect. And any continuous habit of thought which turns an imperfect mind wholly away from itself, prevents its progress towards perfection. The highest excellency which could result from it would resemble that of Aristotle's Wise Man. The merely "positive" philosopher may be deeply cognisant of the physical world, familiar with the sphere and power of Mathematics, with a deep-seated enthusiasm as to the extension of knowledge, and the possibility of new and more perfect combinations in that wonderful social system of which man is the monad; but the existence of God, as a first Cause, is not essential to his speculations—far less, of God, as a moral Governor. His temptation is, to regard the deeper instincts of the heart as so many facts which would be useful in an inductive Psychology; not as principles of action or feeling, with a final cause of their own—no less than the forming of man after the model of his Creator.

The Conceptual School, though it has the

truth on its side, is not without its dangers. Its tendency is, by passing from the formal to the pure Science of Thought, to blend Logic with Metaphysic. Thus it is apt to neglect facts, to which it should legitimately apply itself, and, betaking itself to general theories, work out the world of thought without sufficient data, or any real guide beside the very imperfect test of its own intellectual consistency. This defect is however a perversion, and not a natural consequence of its leading tenet. And such antecedent systematisation is a less evil than has been imagined; being often assumed only for the time by honest and candid minds, as a clue by means of which to conduct hypothetical enquiries. It is adopted at first as best tallying with the known facts: and further research may either corroborate, modify, or overthrow it.

In quitting the subject of the different logical schools, it may be useful to give an illustration of the practical differences among them, in the various senses in which they have employed the term *Category*; much to the bewilderment of those, who have expected, wherever it occurred, to recognise in it a common meaning.

We naturally look to Aristotle in the first place for the meaning of the word. A *Category*, if we regard his use of the term as well as its derivation, signifies a *Predication*; and is therefore primarily connected with language. Accordingly, as has

been already hinted, the ten Predicaments are gained by an analysis which is mainly grammatical; and answer to the leading parts of speech, and certain modifications of them. The scheme may be stated as follows. The *Category* of *Substance* is appropriated to nouns substantive, which express existence independently of time, or, as it may be otherwise put, do not imply motion. To these nouns adjective attach themselves, which, being loosely and generally divided, give the three *Categories* of *Quantity*, *Quality*, and *Relation*. The verb, on the other hand, as contrasted with the noun, indicates existence which is in time, and connected with motion. If the time which it implies is *past*, our attention is called to a certain state which results from some motion which has preceded; thus the past tenses of verbs come under the *Category* of *Habit*. The remaining parts of the verb are portioned out according to the nature of the motion or change implied in the verb itself: as this is active, passive, or neuter, they fall into the *Categories* of *Action*, *Passion*, or *Position*. Adverbs, which, so to speak, coalesce with verbs, supply the two remaining *Categories* of *Space* and *Time*.

This division, it is easy to see, is essentially grammatical: far from being the only one possible, probably not the best; yet recognising the classes of words generally acknowledged, and, if confined to the province of language, substantially true and

correct. If therefore it has not been received, it has not been vigorously opposed by the verbal school. Horne Tooke grounds his theory of language on the same fundamental division with Aristotle; and Hobbes, asserting, as in consistency he is bound to do, that the Categories are distinctions of words, and not of things, and acknowledging that they are not a true or exact ordination of names, passes them by (a rare circumstance with him) without any more positive censure.

Such are the Categories of Aristotle—in their nature and use, as in the method of attaining them, essentially verbal. We have seen, however, that they have been used also as expressing a division of *things*. For this purpose, they are undoubtedly unfitted. They are a cross-division, according to Aristotle's own admission; *Quality* and *Relation*, for instance, running in to each other in the case of *Habit*, and *Position* falling under *Relation* as a species under a genus. Again, although in a fundamental division we do not require equal importance and extent in all the several members, yet there is something unphilosophical in the disproportion of the method, which lays so much stress on the four leading Categories, and passes so summarily over the other six. Gilbert de la Porée met with little success in the endeavour to raise these inferior castes to the level of their more fortunate conquerors; nor could we expect

great results for this or any other attempt at altering so greatly the system as it was left by its founder, without entirely overthrowing it. Further, allowing the Categories for the time to be an exhaustive division, they need not therefore be a natural one; like merely artificial classes, they have the smallest possible number of distinguishing attributes, as may be seen by Aristotle's weak attempt at marking out the four principal of them by their properties. These objections lie against the Categories on Aristotle's own hypothesis, without any introduction of the distinctive teaching of other metaphysical schools. When these are brought to bear upon them, their position and claim to notice are yet further altered.

It is one of the most usual and natural, perhaps one of the most pardonable, errors of great thinkers, to believe a far greater identity of aim and purpose than really exists between former labourers in the field which they are cultivating, and themselves. Incidental traces of agreement gain undue importance from their faith in the sympathy of soul with soul, the unity of knowledge, and the progressiveness of truth. They explain the unknown by the known; and whatever is clear to them, is taken to illustrate what appears obscure in others. Writers who are devising original systems, and touch only incidentally upon the opinions of others, are remarkably given to this error. And even among those whose peculiar province it is to weigh

and compare facts, the historian of Philosophy, as of any other branch of knowledge, viewing as he does the past by the light of the present, is apt to over-rate the degree of excellency attained in times gone by. An unintentional hint or unconscious anticipation of a truth as yet latent is very frequently mistaken for a discovery. Most men whose inventions have benefitted mankind have been robbed of some of their glory by some obscure forerunner, from whom they are unjustly supposed to have taken an idea which he had half seen, but never clearly apprehended. And this over-estimation of former enquirers sometimes reacts to their discredit, when they are wrongly supposed to have taken the same view with ourselves, and are accordingly censured for imperfections which they could not have discerned, and for the omission of points which were really unessential to their system.

We may thus account for the mistaken view which Kant took of the Aristotelian Categories. His metaphysical labours took a very different turn from those of most of his predecessors. His aim was to turn our thoughts mainly on ourselves, and, leaving the nature of the external world unexamined, to transform Metaphysic, from being the science of the laws of Being, into the science of Mind. He was anxious to discover how the conceptions naturally inherent in our minds affect phenomena, or things as they appear to

us. That he might be the better able to ascertain this point, he attempted an enumeration of these conceptions. He erroneously supposed, however, that Aristotle had already made the attempt in his Categories, and, being sensible of the imperfection of the scheme, had endeavoured to make it more complete by the addition of the post-predicaments, or five supplementary Categories. But this mistaken position, independently of its want of external evidence, is confuted by internal. Inspection sufficed to show, that the post-predicaments are merely terms of wide and general application, but having several distinctions of meaning, which Aristotle thought deserving enumeration. The last of the five, for instance, is *Habit*, which, far from being supplementary to the Categories, is in fact a Category itself.

Supposing that we could think with Kant, that Aristotle in his Categories had the design of investigating those conceptions, which dwell in the pure understanding, his scheme would be indeed imperfect, and abundantly liable to objection. The arguments which Kant brings against them would be on this ground quite conclusive; namely, that our idea of *Motion* (one of the five post-predicaments, which are *Opposition*, *Priority*, *Simultaneousness*, *Motion*, and *Habit*) is empirical, and not derived from the understanding; and that *Action* and *Passion* are deduced, and not primary conceptions. *Time* and *Space* too, with the post-predica-

ments of *Priority* and *Simultaneousness*, must (by those who admit Kant's very questionable view of Time and Space) be regarded as not belonging to the class of conceptions at all, but as being modes or conditions of our sensibility. Kant accordingly substituted for the old array of predicaments and post-predicaments, a new list, devised by himself, of Categories, or, as he and his followers define them, "subjective conditions of thinking," "rules which the understanding, by means of its own essential laws, lays at the foundation of nature, foregoing all the given diversity of consciousness;" or, as we may less technically describe them, conceptions under which alone we can conceive it possible that two terms shall be united into a proposition. And the result is the following list of twelve Categories; *Unity, Plurality, Totality, Affirmation, Negation, Limitation, Independence, Dependence, Interdependence, Actuality, Possibility, and Necessity*.

Mr. Mill takes another view of the Aristotelian Categories, which makes it necessary for him also to devise a new set of his own. According to him, Aristotle, as well as the Schoolmen, intended the Categories to be an enumeration of all things capable of being named—an enumeration by the *summa genera*, i. e. the most extensive classes into which things could be distributed. This position we have seen to be true with regard to the Schoolmen, but probably false with regard to Aristotle.

Granting its truth, however, there is no difficulty in proving that the Categories, though perhaps valid as a division of *names*, are obviously invalid when taken as a division of *things*. Mr. Mill easily establishes this, by appealing to the fact which has been admitted and illustrated, that they are, in this light, a cross-division. And, this done, he proceeds to give us his own Categories, which are four in number. All nameable things, he tells us, are either, I. Feelings or states of consciousness; II. Minds which experience these feelings; III. Bodies or external objects which excite certain of these feelings, together with the powers or properties whereby they excite them; and, IV. The successions and coexistences, the likenesses and unlikenesses, between feelings and states of consciousness.

Without pretending to discuss this scheme at length, we may observe, that it should, at least, be received with extreme caution. In the first place, it does not seem to be exhaustive, seeing that no Spiritual Existence, save human minds, finds a place in it. Secondly, it appears to deny the fact, and indeed the possibility, of spiritual influences; since, according to its obvious tenor, all feelings or states of consciousness come either from the mind itself, or from bodies external to it. Thirdly, even were it an exhaustive division, this, though it would imply its truth, would not establish its importance. It need not be the natural division

which lies at the base of all sciences. Its generalisations are of that kind which cannot fairly be assumed, on Mr. Mill's own principles, to be scientific, till Inductive Science has worked its way almost up to the apex of Knowledge. In a word, as Logical, it is out of place: as Metaphysical, its correctness and usefulness are doubtful.

Lists of Categories, in point of fact, are foreign to the nature of Logic altogether. Those of Aristotle properly belong to Grammar; those of Kant, to Metaphysic in the modern sense of the term; those of Mr. Mill, to Metaphysic in its older sense, or, in Aristotelian phraseology, to general Physic. So we find Categories quite independent of Logic, as belonging to the apparatus of each Philosophical School. Traces of similar schemes are found in the Indian Philosophy, though there, it must be confessed, in close union with Logic. The Pythagorean, Platonic, and Stoic Schools among the Greeks had each its corresponding tables. And thus the word has come to mean the distinctive classification of each Metaphysician, whatsoever his system leads him to discuss, or howsoever he divides it. Thus Reid tells us¹, that the Categories of Locke are three—Substance, Modes, and Relations; and those of Hume two—Ideas and Impressions. And he adds, amusingly enough, that an excellent Mathematician of his day desired to substitute for

¹ Aristotle's Logic, ch. ii. sec. ii. p. 688. Ed. Sir W. Hamilton.

the Peripatetic predicaments two only—viz. *Data* and *Quæsitæ*.

And now we bid farewell to the Historical view of Logic. Henceforth the labours of past thinkers will come before us, only as bearing fruit at present, in the consequences which have been traced from them and from the ideas which they have involuntarily suggested.

CHAP. VI.

ON LOGICAL METHOD IN GENERAL.

WE now proceed to the direct consideration of the nature and office of Logical Method. In doing so, it will be prudent to recapitulate those assumptions regarding it, which have been implied, if not stated, in the previous pages.

Logic, then, is no part of Philosophy; or, in other words, it is not a Science. The student of pure Logic has, as such, no more speculative knowledge on any particular subject of investigation when he concludes his course than when he began it. The basis of Logic may show through indeed, and so some insight into Metaphysic be gained; or its application by way of example may inform him of physical truths before unknown, or extend his knowledge, as the case may be, in Art, or Morals, or Theology. But this does not really affect its proper nature as a system of rules implying previous knowledge, and ministering to its further attainment; but of little value in themselves as theoretic truths, and even assuming an Imperative form more naturally than that of a Proposition.

This then is our main point of difference with the Ancients. In another respect, we have seen,

we differ from the mediæval teaching. For our Logic, though co-extensive with Philosophy, is not practically identical with it. It exercises no supremacy over matter; rather, the subject to which we apply it greatly modifies its nature. It is not like a glass through which we look, and which gives its own colouring to every thing seen through it; rather, like a mirror, it copies to the mind's eye that which exists external to itself, and its praise is to be faithful, not to be original. As that which is presented to it varies, it, while it preserves its identity and truthfulness, nevertheless varies, or seems to vary also.

This we allow to be the case with Logic in general. Abstraction, Division, Definition, for instance, are not purely formal processes; they can only be considered with reference to a definite subject, and cannot be applied to all subjects; nor will they adapt themselves to all which they include with equal accuracy and perfection. Considerations of Modality, again, have been introduced into the second part of Logic; they are generally, though not universally, allowed to bear directly or indirectly on the divisions of Propositions. In the third part, again, it now seems nearly established, that the Deductive and Inductive Syllogism are two essentially distinct kinds of argument; and that the nature of the subject under consideration determines which is the more suitably employed. It then the nature of the subject exercises such an

influence, in the several parts of Logic, over Terms, Propositions, and Syllogisms, it is only reasonable to suppose that it extends to the whole conjointly, and may be traced in the consideration of Method also, which is their available combination.

If then, in considering the subjects to which Method applies, and the manner in which it applies to them, we see certain broad divisions, distinct not merely in their accidents but in principle, and observe that its nature is greatly modified as one or another of these is brought under it; the same law, which justifies us in considering Inductive Syllogism as distinct from Deductive, because the one leads us from singular to universal, the other in the reverse direction, will justify also our dividing Method into several distinct portions. And such division appears, accordingly, to be both desirable and necessary.

For though all Logic, and therefore all Logical Method, deals with conceptions, it does not deal with them always in the same manner. Conceptions may be connected together on a large scale, but with very different objects and on very different principles. Take, for instance, any Science, whether deductive or inductive. Here we have a multitude of conceptions grouped under one leading conception, which we call an Idea, on some received principle of classification; and possessing among each other, in a greater or less degree, subordination and consequentiality. And the ob-

ject of this complicated intellectual structure is not, directly, practical use, but Knowledge. It is natural that the method here employed should differ widely from that which is suitable to a case of Practical Evidence, in which certain conceptions and combinations of them in the form of propositions, being posited, we go on to investigate some particular fact, or some principle viewed as a fact, as dependent on them; the question being, not *how* the whole fabric hangs together, though such continuity is really indispensable, but whether from these data such a fact does follow, the ultimate law of consequence possibly remaining unknown. And between Science and Practical Evidence there lies another field, that of Art, in which we do not bestow our attention exclusively either on the fact, or on principles of subordination and consequentiality; but endeavour, with a view to practice, so to combine our conceptions, that the principles may bear directly on the facts, and facilitate our cognisance of them.

Method then, divides itself into these three branches—the Method of Science, of Art, and of Practical Evidence. Of these, the first will hereafter especially claim our attention, both as most fully illustrating the laws of Logic, and as being the Type towards which the inferior divisions tend, and to which in proportion as they approximate, they claim dignity and precedence.

CHAP. VII.

ON THE METHOD OF SCIENCE.

IN all Science, then, when perfectly formed, we have, as has been said above, a certain unity of structure. We find a multitude of conceptions grouped together under one leading Conception, which we call an Idea, on some received principle of classification; these conceptions possessing among each other, in a greater or less degree, subordination, and consequentiality. And the object of this combination of conceptions is not directly practical use, but Knowledge. This may be illustrated from sciences of different kinds, the distinctions between which shall be given hereafter; the points of resemblance are those which claim our attention at present.

To take in the first place the science of Geometry, which will serve as our type of the *Pure Sciences*. Here we have the idea sufficiently definite, namely, Space, or Extension. Under this, conceptions of very different kinds are grouped together, such as triangle, square, circle; equal, unequal; contained, containing; similar, proportional. Those which have a more direct reference to the Idea of Space

fall at once under certain elementary and received principles of classification suitable to the science: thus space itself divides according as it is simply linear, or bounded by lines or surfaces: and geometrical figures in general divide according to the nature of these lines and surfaces, as they are straight or curved; or again, according to the uniformity or relative proportions of their parts, as when we speak of certain triangles as equilateral, and certain solids as regular. Further, when these conceptions are arranged in order of formal proof, there is of course a consequentiality existing among them; this dependence of part upon part, and of the whole upon the Idea, being one of the most remarkable features of Geometry. And this consequentiality implies a certain subordination; for the different propositions do not depend for proof directly on the Idea, but admit among themselves of greater and less degrees of generality. Thus the Axioms, Postulates, and Definitions cover very frequently a wider ground than the particular Theorems and Problems; and of these, some are evidently wider in extent than others. Whatever is proved true of triangles in general, for instance, applies to equilateral triangles; while the converse does not hold.

In the next place, Botany may stand as a specimen of the *Classificatory Sciences*. Here the Idea may be differently stated, as being in the abstract, Vegetable Life; or in the concrete, the

Vegetable Kingdom. The spontaneous observation of mankind, even prior to scientific enquiry, had supplied a vast number of conceptions to be grouped under this Idea. The names of individual trees, and shrubs, of different portions and organs of the plant, exist prior to scientific arrangement. These are duly grouped under the Idea, by means of certain intermediate conceptions, which belong properly to the science of Botany, and may or may not be distinctive of the different botanical systems. And in this arrangement a Principle of Classification is involved—the difference of this principle, and not any diversity in the detailed view of species, for instance, distinguishing a natural from an artificial arrangement. And to show that the principle adopted enables us to arrange the conceptions in due relation and subordination to the Idea, is the task which each advocate of a peculiar system undertakes.

Of another class of sciences, the *applied* sciences, we may take Mechanics as an example. Here we have one Idea, viz. that of *force*. There are certain principles, further, according to which we can subdivide this idea. Thus the Idea of force combined with the conception of Rest or Counterpoise limits itself to *Statics*, when combined with that of motion, limits itself to *Dynamics*. In each of these divisions there are other conceptions which enable us to subdivide them; such are implied, in *Statics*, in the laws of solid and fluid equilibrium, and,

in *Dynamics*, in the three great laws of motion. These, when traced into their consequences, give us certain combinations of conceptions, which are subordinated to the main Idea, and connected with it through them by a necessary dependence.

Lastly, a perplexed and complicated science, like that of *Astronomy*, in which Deduction and Observation find place together: where different parts of the results are gained by different processes, and in the vast array of laws, and inferences, and general facts, and details, the unity seems almost broken; forms no real exception to the notion of a science which we have adopted. The only uncertainty is, in which of two ways it shall be made to conform to our requisitions. In one point of view, it must surrender its claims to the dignity of a distinct science; and rank only as the application, on an enlarged scale, of an independent science to the explanation, or, it may be, prediction, of a vast mass of previously arranged and classified phenomena. Astronomy thus becomes the Mechanics of the Heavens. And this is the explanation of its nature which a Mathematician would be likely to give. Or, again, the Physical Philosopher might ask—what is it which enables us to associate so readily in our minds phenomena so different as an eclipse, and the course of the planets, and the nature of nebulae, and the form of the earth, and the distance and density of the sun, but the presence of one Idea—that of the Universe,

or, in other words, of the interdependence of all material Nature? May not Astronomy be regarded as the science *of the Universe*, using, for different purposes, the apparatus both of the classificatory and applied sciences; and so aiming at the reduction to order and unity, under this Idea, of a multitude of conceptions drawn from phenomena, which seem at first likely to perplex as much from their unlikeness as their multiplicity?

If the foregoing be, as far as it goes, a true account of the nature of Science, it is evident that any view of Scientific Method will be in the highest degree imperfect, which does not treat of Scientific Ideas, of the conceptions which range under them, and of the laws which regulate this arrangement. To the first of these subjects we now proceed.

CHAP. VIII.

ON SCIENTIFIC IDEAS.

A SCIENCE then, however much more it may be, is at least thus much; the union and grouping of conceptions under an Idea. Hence arises a question evidently deserving our consideration—what the nature of such Scientific Ideas may be.

The difference between an Idea and a Conception has often been drawn, by those who insist on the distinction, with great care and deliberation. A Conception, it has been said, is something derived from observation; not so Ideas, which meet with nothing exactly answering to them within the range of our experience. Thus Ideas are *à priori*, Conceptions *à posteriori*; and it is only by means of the former that the latter are really possible. For the bare fact, taken by itself, falls short of the Conception, which may be described as the synthesis of the fact and the Idea. Thus we have an Idea of the Universe, under which its different phenomena fall into place, and from which they take their meaning; we have an Idea of God as a Creator, from which we derive the power of con-

ceiving that the impressions produced upon our minds through the senses result from really existing things; we have an Idea of the Soul, which enables us to realize our own personal identity, by suggesting that a feeling, conceiving, thinking subject exists as the substratum of every sensation, conception, and thought. Others go further in the same direction, and argue, that Space and Time, which they call conceptions, shadow forth dimly the ruling Ideas of Infinity and Eternity; that the Divine Attributes are Ideas, under which fall even the highest conceptions; that from Omnipotence comes the conception of Power, from Omniscience that of Knowledge, from the independent Essence of God that of dependent Being, and so on. And this brings us to another grade of opinion, adopted by some; namely, that Equality, for instance, and Similarity, must be Ideas, the pre-existence of which enables the mind to recognise things as like and equal; these too, it is said, having no exact counterpart in experience, for we have never met with phenomena which are absolutely like or absolutely equal. And now we are evidently trembling on the verge of the Platonic doctrine, according to which each visible and perishable Phenomenon corresponds to some intellectual and eternal Idea.

Although there may be much truth in the general impression which these views convey, they cannot, with any distinctness, all be held together. Indeed, however true any, or, were it possible, all of

them might be, they would nevertheless not be to our purpose. For we are seeking a practical rather than a metaphysical distinction; and are investigating the nature, not of Ideas in general, but of Scientific Ideas only. Sometimes, indeed, that which a metaphysician would recognise as an Idea, lies at the basis of a science; thus Psychology (if that be at present a real science) refers itself to the Idea of the Soul, and Theology to that of God. In other cases, however, what is called on the above theories a Conception, is really a Scientific Idea. It is, for instance, on the Conception of Space, not on the Idea of Infinity, that the science of Geometry has been raised.

It will be better, for our present purpose, to take a different course from that which speculations like those above suggest; and passing by all such questions as concern the abstract nature of Scientific Ideas, the manner in which they are attained, their necessary connection with the human mind, and the like, to regard them simply as a species of conceptions—that is, definitely, as conceptions on which sciences can be founded. Our question then assumes a more practical shape, and may be stated as follows—what attributes fit a Conception to become the foundation of a Science?

We shall escape one great danger by throwing our enquiry into this form. The human mind is, as we have before observed, naturally disposed to trust too much to method, to venture on this

presumption beyond the bounds of experience and lawful proof, and, not content with ascertaining what is, to determine, as it thinks, what must be. There have been *a priori* enumerations on almost every subject from the planets downward; reasons have been given why they, and the senses, and the Categories, and the main divisions of the world, and the primitive substances of Chemistry, should be neither more nor less numerous than they were supposed to be; till further research has proved the falsity of the suppositions for which these reasonings were to account, in some cases; and has rendered their truth uncertain in others. It is well to avoid any risk of falling into this delusive and untrustworthy mode of enquiry: and this end will be effected by keeping the above question steadily before us—by the presence of what attributes do we distinguish Scientific Ideas from other Conceptions?

There is the more reason for taking this view of the question, because there seems to be, on the face of things, an absolute impossibility of confining these Ideas, in our present state of knowledge, to any definite number. Sometimes conceptions, which have been fated to become the basis of sciences, have been long altogether unknown, as was the case with the Ideas of Galvanism, Electricity, and Magnetism. Sometimes fresh discoveries with regard to a Conception, which has been long familiar, elevate it to the dignity of an

Idea. Thus the conception of Heat long preceded the dawn of a science of Thermotics. Sometimes the Idea, though it retains the same name, becomes, from the association of new phenomena with it, practically so far different, that it may be fairly doubted whether it be really the same Idea as before. Thus Optics assumed a new form when the ray of colourless light was discovered to be compound; and Harmonics underwent a still greater metamorphosis, when the properties of musical notes came to be considered as dependent not on the length of string, but on the number of vibrations.

Indeed it would seem, that Science follows as surely upon Practice in matter of fact as it precedes it in theory. Let any set of phenomena once be shewn to be of practical importance to a large part of society; and human industry combines with curiosity in the endeavour to show their relation to each other. Science will soon be at work to discover the principle which shall reduce the mass of perceptions to order. Thus Medicine, and Theology, which appeal directly to the strongest and deepest cravings of human nature, have been again and again systematized. On the other hand, where the importance of a subject is of late discovery, the corresponding science is of late origin also. The science of Catallactic has only arisen since the world has been comparatively peaceful, and whole nations and continents have

felt their permanent welfare to depend on the principles which regulate exchange.

As the world then grows wiser and busier, as men expand the sphere of their operations, Sciences will increase in number, and, with them, Scientific Ideas. It does not follow, however, that, though this be true in the long run, each advance of human Science involves a corresponding increase in the number of Ideas. On the contrary, their number may diminish, when two or three apparently distinct branches of knowledge are traced back to a common stock, and are henceforth treated as one. So a point of union has been discovered in Galvanism, Electricity, and Magnetism. And Cuvier has given some hints towards a Zoology, or Science of Life, of which Botany and animal Zoology may prove ultimately to be mere subdivisions. And attempts have been made to account for vital action in a manner, which, were it correct, would bring it, according to the different theories, under either Chemistry or Electricity.

Least of all, however, can we hope to have all Sciences reduced to that unity, which is implied in the Scholastic type of Deduction, or the Baconian type of Induction. The thought of one vast Science grounded on the Idea of Being, furnished with its due array of subordinate principles, whether we call them Categories, or by some other name, including in itself all possible knowledge, assigning its place to every producible phenomenon, may

stand before us as a great Ideal, but one which we must confess is unattainable. Though some connected Sciences may show a disposition to fall into each other, yet the lines of scientific enquiry must in general be treated as parallel and independent. If there be, as there seems to be in the Divine Mind, a perfect pyramid of knowledge, yet the apex is so far distant from us, that not only is it itself invisible, but the sides of the pyramid have no sensible inclination towards it. Like the vast majority of the fixed stars, it has no ascertainable parallax.

What attributes, then, we proceed to enquire, fit a Conception to become an Idea, and be regarded as the basis of a Science?

It is evident that every Scientific Idea must be distinct, and that this distinctness should, if possible, be put beyond doubt by definition. But, for reasons which shall be given hereafter, Scientific Ideas can very rarely be defined.

Distinctness, however, though requisite to Scientific Ideas, is by no means confined to them. It is necessary in every Conception which we employ, for whatever purpose, in Science, or Art, or the conduct of life. Indistinctness is that defect of conceptions in general, which Logic professes to remedy. If it remain uncured, there can be no trusting the second and third operations of the mind, while there is such imperfection in the first.

Obviousness is another feature, which, though essential to Scientific Ideas, is by no means confined to them. But it is not, like distinctness, to be sought in all Conceptions. We have a right to expect it only in the Idea, and in those lowest scientific Conceptions, which, in the classificatory sciences (which perhaps exhibit this principle most clearly) coincide with the phenomenon. Common-sense, though not equal to forming Sciences, exercises over them a kind of dominion when formed. Thus the Deductive Method of investigation requires that some obvious Idea, with its attendant principles, whether gained intuitively or empirically it matters not, should be assumed first, and then traced into its consequences. During this process, it may be allowed to disappear from the surface of the speculation, to become abstruse and complicated in the forms which it assumes, so as to escape the ken of every mind but that which is truly scientific; but it must issue again at last into the light of day, and show the result of its proceedings. Not the most abstruse Sciences are exempt from this law; they must be capable of being made popular at either extreme. In Geometry, for instance, the Idea of Space, the Axioms and Definitions, on the one hand, and the enunciations of the particular propositions, on the other, are at once intelligible to many who find the greatest difficulty in perceiving how these propositions depend for proof on their ultimate data.

The Idea of that most complicated of all Sciences, Astronomy, is perhaps the most obvious of all; and the results to which it leads are the most generally interesting. And how many persons have just the general Idea of Botany and Zoology, and a keen sense of the beauty and wondrousness of individual instances of animal and vegetable life, who on these subjects find exceeding difficulty in passing the bounds of the merest empiricism, and entering into the spirit even of the outlines of a really natural system.

It was said above, again, that the practical importance of a Conception is necessary in order that it may become an Idea. This, however, seems not quite the kind of test to suit our present purpose. In this practical importance, indeed, the reason lies, which leads the mind of the investigator to dwell more upon the Conception, and found a Science upon it. Still, it does not indicate a feature which belongs to the Idea as such, but rather an antecedent fitness in the Conception for its afterwards becoming an Idea.

A more important mark of Scientific Ideas, and one which belongs to them more properly as such, may be found in what we may call their *generality*. Every Science professes a certain breadth of range. As there cannot be a Science of an individual, so neither can there be of a narrow class. This is evidently natural. We attribute such importance to the unity of Science, simply because it enables

us to collect together much which would otherwise be separate. Were its field so narrow, that observation could thoroughly cover it, or memory exhaust its details, or common sense decide upon all its questions by the process of weighing each particular case, we could much more easily dispense with it. So we are always disposed to adopt as an Idea that conception which gives the greatest Generality, the widest possible Unity. So, as we have seen, the early endeavours after systematic Truth hit on the magnificent vision of a single all-embracing Science. And, as knowledge proceeds, men are, as we observed, very ready to diminish the number of Sciences by melting several into one. Conjecture on this as on other points even outstrips enquiry: as at present some entertain the hope of discovering a single science of all "imponderables." The union of Statics and Dynamics under the common name of Mechanics illustrates the same tendency. And perhaps it is to the same cause that we must refer the very common, and, it must be allowed, justifiable inclination for viewing Astronomy as a single Science.

This generality, however, by itself does not satisfy our requisitions; we must also have in a Scientific Idea a quality which we may be allowed, by way of contrast, to call *particularity*. Or, to use a phrase more usual and striking, though perhaps for our present purpose less correct, Unity

in Science is not enough, unless there is also Plurality.

Science, we have said, must have a certain breadth: but in that breadth it must not be too uniform. No Universals will serve its purpose, however wide they may be, unless they are capable of division and subdivision, and so can descend to details. Any system, which is deficient either in Generality or Particularity, can only half satisfy our preconceived notion of scientific perfection. A-priori principles of Physics, like those which Kant has given, illustrate generally the former of these defects. They are true enough, but, when admitted, they are too indefinite in their application to be useful, and cannot be so combined as, by limiting each other, to descend to particulars. The Idea of Being is thus shut out from the number of Scientific Ideas. For we can invent few propositions of which this can be the subject. Scholastic ingenuity could not discover more than three predicates which were suitable to it—Unity, Goodness, and Truth. And, after its first division into Substance and Attribute, the distinctions became either empirical or arbitrary. Causality is another conception, which has abundant breadth for a Scientific Idea, but which yet is not the foundation of a Science. Why is this? because the number of propositions as to the relation of cause to effect is exceedingly limited; neither does the Idea naturally subdivide, and so descend

to lower conceptions, which the mind can readily embrace, and in which we feel a practical interest.

But a Conception may have both Generality and Particularity, may associate itself with broad Universals, and allow a multitude of Singulars to be combined under it, and yet be unfitted for a Scientific Idea, if it be incapable of *consequentiality*. Unless it be such, that the subordinate conceptions and propositions seem somehow to be connected with it as Effect with Cause, unless it be a kind of nucleus of which the whole Science is a development, we cannot allow it to be really an Idea. Hence, it would seem, certain Ideas have been supposed to be necessarily intuitive; because, when they are once fully understood, the main principles of the Sciences over which they preside, though gained at first empirically, assume the appearance of consequences from them. Be this as it may; thus much seems clear, that every Science, and therefore every Scientific Idea, implies some consequentiality.

This is evident in the pure deductive Science of Geometry, which would fall to the ground, were it not for the Definitions, Axioms, and Postulates flowing naturally from the Idea of Space; and the several propositions which follow being only the legitimate consequences of these data. The truth is least obvious in the purely classificatory Sciences. Botany, for instance, or Geology, appears at first sight to be only the arrangement of phenomena

known by observation, according to a fixed plan, and not to involve any notion of consequence. It might be thought that any introduction here of Antecedent and Consequent, Cause and Effect, was quite out of place. Yet it is not really so. A purely artificial arrangement, in which the phenomena are grouped according to an arbitrary principle, has no claim to the name of a Science: and we shall see hereafter, that in proportion as a classificatory Science becomes natural, it approximates to the consequential Type.

All the Conceptions, then, of Science, the highest, or Idea, as well as the intermediate and lowest, must be distinct. The highest and lowest must both possess a certain Obviousness which is not required in the intermediate conceptions which are employed to connect them. And further, the Idea, which will always be a Conception of practical importance, must possess the attributes of Generality, Particularity, and Consequentiality. And under this the other Conceptions must fall according to a certain system of classification. Into the nature of that system we may now proceed to enquire; and this consideration will naturally lead us to speak of Definition, which, besides being, as was remarked above, highly conducive to Distinctness, is of the greatest importance in connection with several aspects of Science.

CHAP. IX.

ON CLASSIFICATION AND DEFINITION.

IN considering the subject of Classification, it will be of importance to keep constantly in view the distinction between the *principles* on which we classify, and the *method* which we employ in the process. The most prominent point of difference is, that the Principles are material, while the Method is formal; the former vary with the different Sciences, being the main Conceptions which come to our aid in establishing a connection between the lowest Conceptions and the Idea; the latter, when these principles are given, enables us to estimate, and as it were to measure, the relation of the various Conceptions included in the Science, to the Idea and to each other. Thus the absence, presence, and number of cotyledons point to the principles of Classification in a natural system of Botany; and absorption, assimilation, exhalation, growth, and generation, occupy a corresponding place in Zoology. The Method of Classification, on the other hand, is the same for all the Sciences. And of this we now proceed to treat.

The scheme of Predicables contains the Method of Classification which Aristotle in part invented, in

part found ready to his hand, and which has descended to us through the Schoolmen with alterations which affect its form more than its substance. Its most received terms have, however, escaped from the Schools, and become the property of the world. Every one who pretends to knowledge talks of Genus and Species, Property and Accident, if not with logical accuracy, at least in a sense of his own. And this renders it the more desirable that we should retain its terminology, and adopt its spirit, so far as we properly can. The objections against innovations on received systems apply here with more than usual force. And it will appear, that, with some cautions and modifications, we need not seek a new method of Classification, but may let the Predicables stand.

It has been customary to attain the five heads of Predicables in one of two ways—the one, more generally known in consequence of its adoption by modern logicians, according to which Species expresses the whole essence, while Genus indicates the common, Differentia the distinguishing part of the same Essence; and Property, something joined necessarily, Accident, something joined contingently to it;—the other, more agreeable to Aristotle, and more commonly employed by the Schoolmen, which begins by separating Genus and Species, as coming under the predicament of Substance, from the other Predicables, which are predicated in Quality.

Now perhaps it would be unfair to object to the term *Essence*, when taken barely and without explanation, that it implies of necessity, as it certainly does by association, an assent to the realistic doctrine of inherent forms. At any rate, the formula, which leads us to describe *Genus* by its being predicated of things differing in species, as *Species* is in its turn of things different in number, is free from this imputation. But they are both liable to another objection, which lies deeper—namely, that they assume our possession of the power to decide generally what attributes are really part of the *Essence* or *Substance* of any given thing, and what are not.

In other words, they assume, perhaps unwittingly on the part of those who adopt them, the possibility of a science of *Being*. If we could, for instance, satisfactorily answer the question,—what is the essence of *Man*; we should in so doing enumerate fully all those attributes, in virtue of which the name of *Man* is applied to him. Granting that he is according to his essence a rational animal, all other attributes, beside those of animality and rationality, must fall under one of the lower predicables. We could not raise above the level of *Property* or *Accident* his outward form, his position in the animal and in the intellectual world, his condition as a moral being, his capability of government or other social relations.

The erroneous consequences which flow from

this view are obvious. If we follow it, we must allow, that, his definition once attained, no researches, metaphysical, moral, religious, social, physiological, of which *Man* is the subject, can have a valid claim to the name of *Science*. They are the investigations, not of the real nature of *Man*, but only of certain secondary qualities belonging to him. They misplace *Man* for the time, throw him out of his proper rank in the scale of things, and raise those features of his being which are subordinate or collateral, to the place of the highest dignity. Thus the unity of knowledge would seem to be disturbed, and the natural arrangement of *Truth* broken into, by a misplaced and importunate ingenuity.

Such inferences of course cannot be correct. It is impossible that any one view of *Man's* nature can have such right to exclude every other. His physical organization is not to be neglected, because we attach importance to his reason: his individual being has no right to overpower his social; and so on. If the system of the *Predicables* is to stand, it must be placed in a light which will admit of its application to *Sciences* in general. If we show by their aid the relation of a *Conception* to a given *Idea*, this must not disparage our investigating, as a separate question, its relation to another also.

In order then that the *Predicables* may occupy their right position, we must be content to regard the whole question as one of relation; and to

admit, that any given individual cannot, on logical grounds, be ascribed *absolutely* to any species; but in order to fix its species, and by consequence to assign to its other attributes their proper place as properties or accidents, we must view it in reference to some *Scientific Idea*.

Our old example will not be the worse for being the most obvious and most common. Suppose an individual human being put before us, and the demand made that we should fix his species, genus, differentia, and so on. The problem is one, which, with the individual alone given, even supposing our knowledge of all the circumstances concerning him to be most accurate and perfect, will defy all attempts at solution. Let, for instance, the given man be Nicholas, the Emperor of all the Russias. The difficulty will be to ascertain his species: if this is accomplished, all that follows will be easy enough. But how is this first step to be taken? Of course, if we are considering Zoology, or are content to assume, that the class to which our first natural impulse would lead us to refer him is really his species, there will be no difficulty in answering at once, Nicholas is by species a Man. But supposing that we are dwelling rather on some Idea which does not extend beyond the human race; that, to take a particular case, we are constructing a Science of Civil Government. We shall then divide men, it may be, according as they are governed or governors: and subdivide the latter

according as they govern in common with others, or are governors sole; and this subdivision may be further subdivided, as they rule absolutely, or under certain limits of law or constitution. In a scheme of this kind, Nicholas will belong to the species Despot, or sole governor without limitation of law. So, under the Catallactic science, his species will be Capitalist. And the moralist must investigate the affair of the Nuns of Minsk, and other dealings of the father of his people, before he decides under which of *his* two exhaustive species, the good and the bad, he must place the Czar of Russia.

A popular instance like this will serve our immediate purpose, which is, as we have said, not to construct a new theory of the predicables, but to show, under what provisos we may acquiesce in the old one. And, it now appears, that we are at liberty to retain both the received scheme, and the method of attaining it; on the condition, however, either of rejecting the word Essence, or interpreting it as the union of those attributes which are considered to constitute a Class *in relation to a given Idea*.

Adopting, then, this manner of regarding Essence, our view of the Predicables follows as a matter of course. Species will evidently be the expression of all those attributes, which are considered as constituting the Class relatively to the given Idea. And the notion of Classification implies that of order and arrangement. A Class necessarily

suggests to the mind the existence of collateral Classes—standing by its side, that is, as members of the same division. With these, it will have certain attributes in common. These will be represented by the Genus, which may be defined, as the Expression of those attributes which a Class has in common with its collateral Classes. The expression of those attributes in which the Class differs from its collateral Classes will, in like manner, be the *Differentia*.

But, supposing certain attributes to be considered as constituting a Class relatively to a given Idea, it is evident that certain other attributes might possibly be considered to constitute the same Class, when viewed in relation to another Idea. Thus the word Man indicates the same Class, whether it comes from the lips of the zoologist or the psychologist; though the one looks to the form which animal life assumes in his fellow-creatures, the other regards the peculiarity of their intellectual constitution. A question might indeed be raised, whether the Class was in either case strictly speaking the same, or whether we should not rather speak of two different Classes including exactly the same individuals.* But this doubt is quite foreign to our present enquiry; and the two Classes, if they are theoretically distinct, must be allowed to be *practically* the same. And the point which we have to decide is, in what light we are to regard those attributes which are

observed uniformly to accompany a Class; although, when it was formed in reference to a given Idea, they were quite foreign to that Idea, and therefore were not taken into account in forming it. The answer of the Logician here corresponds with the common phraseology of educated men: both would agree in calling them *Properties*; and the predicable “*proprium*” may accordingly be defined, as the Expression of those attributes which are observed uniformly to accompany a Class, though they were not taken into consideration in forming it.

Of the remaining predicable, Accident, little need be said. Certain attributes are observed to be associated with the Individual. The question naturally arises,—are they also associated with the Class? If this be determined in the affirmative, further questions remain. Do they by themselves constitute the Class? If so, they find their expression in the *Species*. Should this not be so—do they *go to* constitute the Class? If so, they are either shared by the collateral Classes, and so fall under the *Genus*, or distinguish the Class in question from the collateral Classes, and are therefore expressed by the *Differentia*. If, though associated with the Class, they neither in whole nor in part constitute it, we have already seen that their expression is the predicable *Property*. If, on the other hand, they neither, in whole or in part, constitute the Class, nor are observed uniformly to

accompany it, they fall under the head of Accident : and that predicable may be defined, as the Expression of such attributes as neither are taken into consideration in forming the Class, nor are observed uniformly to accompany it.

We are now in a position to enter on the subject of Logical Definition. For, in common phrase, we define the Species, by means of its Genus and Differentia. On an accurate use of these terms must depend the distinctness of our notion of Definition. And, by a natural and common reaction, we shall gain a clearer view of the nature and importance of the Predicables, by viewing them in this connection. They are part of the apparatus and instruments of Logic, and cannot be appreciated, unless we consider their use. We shall learn much of them, by seeing them *employed*.

In the first place, then, a Corollary with reference to Definition naturally follows from the above remarks. It is, that all Definition is necessarily *relative*; and therefore that all attempts at absolute Definition are from their very nature failures, and may be rejected without individual examination. To any one who assents to the previous theory of the predicables, this is an evident consequence. For if all correct Definition be, as it is commonly granted to be, by means of Genus and Differentia, and the predicables be in their very nature relative, it will follow of course that Definition is entirely

relative also. But we may attain the same conclusion by a less technical method, and one better adapted to convince the general reader.

What is Definition? Most authorities would agree in answering, that it is the statement in its fulness of the meaning of a conception, or, as some would prefer, of a term. Were then absolute Definition possible, it would exhaust the meaning of the thing defined. To take our old example, Man. If he were capable of absolute Definition, every conception that is necessarily associated with the conception of Man, in the mind of the most enlightened thinker and most extended enquirer, must enter into it. He could not be defined under a folio volume. Those attributes which are observed in him by the Physician and the Moralist have as good a *primâ facie* right to enter into his Definition, as those observed by the Metaphysician and the Naturalist. If one insists on his possession of reason, another may dwell on his possession of two hands, or his place in the scale of moral beings, or the length of his intestinal canal. So the Definition would needs prove in this case an assemblage of most promiscuous and ill-assorted matter. Or, to take another example, that of atmospheric Air; how shall this be defined? By the proportions of oxygen and azote which enter into its composition? or by its relation to animal life? or by its elasticity viewed as a fluid? or by its properties of refraction as an optical medium?

Those who hold that Definition is absolute, must say,—By all of these. All of these conceptions, and many more, enter into the notion which an educated man entertains of Air. And to enumerate any thing short of the whole, would be, on this hypothesis, to define imperfectly.

An absolute Definition therefore is impossible, on account of the prolixity and confusion of ideas which it necessarily involves. It would resolve itself at best into a long string of unconnected epithets. However complete it might be as a general summary of our knowledge on the subject, it would be utterly wanting in clearness, and would prove no remedy for indistinctness.

This being granted, an important consequence follows. We must be content with relative Definition; and therefore, a Conception will be capable of at least as many Definitions as there are Sciences, or, which is the same, Scientific Ideas, under which it falls.

This, again, the Logician who has followed the previous reasoning will not be slow to admit. If all the Predicables imply a reference to a certain Scientific Idea, the Definition, which is composed of two of them, will imply such reference also; and as the Ideas multiply, the Predicables increase, and, with them, the Definitions also. But this position, like the former, admits of being put into a more practical form; into which we proceed to throw it.

All Definition implies Classification. In defining a Class-conception, (and Class-conceptions alone are definable,) we undertake to show the boundaries which separate it from other Classes, with which it might possibly be confused. But as each Science has its own peculiar Classification, it necessitates also a peculiar Definition, by which the Class in question may be separated from all other Classes which the said Science recognises. The same formula which answers the purpose of distinction in one case, will not serve in another. To keep to our old example,—can any form of words, sufficiently concise to be recognised by common-sense as a Definition, be devised, which shall at once show how Man is to be distinguished from Spirits, good and bad, and from other incorporeal agencies; and the point at which he parts company with the brute creation? or, regarding that physical structure which he has in common with brutes, will sum up the features of resemblance and those of difference, which he exhibits when compared with such collateral Classes as the lion and the hare; and his relation to such more distant Classes as the eagle and the ostrich; or, further still, to the oyster and the crab? What an entire confusion would necessarily result from the attempt to bring before the mind at once all these various points of contrast! By one course only can we avoid it. Man must be defined in one way, if we would see his place in the Spiritual

world; in another, if we would regard him in his relation to Good and Evil; in a third, if he is viewed relatively to the Idea of Life. In many other cases a like difficulty is evident, which must be met in the same manner. We should feel a misgiving if called upon suddenly to define feldspar, for instance, or the diamond. The reason probably is, that we should be doubting how to attempt the Definition; whether we should view them as Minerals, or bring them under Chemistry—consult their crystallography, or their analysis. And the mind seems quite at a loss, and set afloat on a wide sea of speculation, when called on to define some Conception which does not fall naturally under any formed Science. In the absence of a true Science of *Æsthetics*, we feel that it is vain to attempt a true Definition of the Sublime, or the Beautiful.

One remark remains to be made on this part of the subject. It has been said above, that a Conception may have as many Definitions as there are Ideas under which it falls. We will now observe, that it may have more. The same Idea may be developed by means of different subordinate Conceptions, which will lead of course to different Classifications, and therefore to different Definitions. Linnæus and Cuvier both bring Man under the genus *Mammalia*; though the one finds his *Differentia* in the number of his incisor and molar teeth, the other in his possession

of hands. Aristotle, who makes his genus *Biped*, completes the Definition by distinguishing him from birds either by the absence of wings, or, which comes to nearly the same thing, the restriction of his motions to this vile earth we tread on. If each of these accounts of Man distinguishes him with sufficient accuracy from other animals, none of them can well be called an incorrect Definition. Yet one of them will of course be superior to the others. This superiority depends on the respective merits of the Classification employed. And that Classification is to be preferred, in which the Idea, and the lowest Conceptions, are connected by the most appropriate intermediate generalisations. What constitutes such appropriateness, it is not hard, in a general manner, to see. Those have the advantage, which, while they apply with sufficient obviousness to the lowest Conceptions, flow at the same time most naturally from the Idea. By their flowing naturally from the Idea is meant, that either reason shows *à priori* their connection with it, or observation and experiment abundantly establish the same fact *à posteriori*. Thus in Geometry the division of geometrical magnitudes into those of one, two, and three dimensions is natural on the former account: finite space implying possible measurement; and length, breadth, and thickness being obviously the three aspects of space which admit of measurement. And Cuvier's arrange-

ment of animals according to the nature of their respiratory and circulating apparatus is an example of the latter kind; it being amply proved by observation, that according to the perfection of the organs of respiration and circulation, the various functions of animal life are more or less perfectly performed.

It is evident that a Definition may in this manner be reduced to those dimensions which custom and reason have allowed it, and very frequently to its ideal perfection of form, in which it consists only of two words, one of which is the Genus, and the other the Differentia. For, supposing a Class to be viewed thus relatively to an Idea, it is not necessary, in order to distinguish it from other Classes which refer to the same Idea, to enumerate all the attributes with which we know it is invested. We only need to draw the line of demarcation clearly between it and those other Classes. And this will be done, if we show, first of all, how it is related to them in the way of resemblance; which is expressed by Genus: and then, how it is distinguished from them by certain peculiarities; which is expressed by Differentia. All its other constant attributes come in as Properties; its inconstant as Accidents; and those only, which are prominent in the scheme of Classification, enter into the Definition. If, for instance, to the received Definition of Man as a bimanous mammal, it be objected, that many other attributes,

besides those of being viviparous and possessing hands, are necessary to our Conception of Man, such as reason, imagination, the erect posture, the face divine; the answer is simply, that, so far as the functions of life are concerned, these attributes are not essential, and that the Zoologist views Man with regard to life, and to no other Idea whatsoever. Linnæus once went so far as to describe the ourang-outang as *Homo Simius*; and the practical inconvenience of such a Definition would not have been sufficient to overthrow it, if the physical structure of the brute had borne out, as it did not, the correctness of the Classification. Indeed, at present it may be doubted with some plausibility, whether the word Man, as employed in different Sciences, always indicates precisely the same individuals. Thus an Idiot is to the moralist no Man; and one theory of capital punishment assumes, that the culprit by the commission of atrocious crime ceases to possess social rights, in other words, to be a Man in the sense of the Political Science. If this be true, the body of the criminal who has been executed would nevertheless be that of a Man for every purpose of the Naturalist.

But there is still room for objection left. It may be argued, that, supposing the Definition to be restricted to one Idea, it may still be a very long affair indeed. The above Definition of Man, for instance, does not express all his attributes which

have reference to life. Why should his prehensile organs be held to have such reference, if those of locomotion are excluded? The fact of his having two hands either has no connection with the Idea of Life, or, if it has, must impart a share of that honour to the fact of his having feet also.

In spite of this objection, our definition of Man may stand. It is valid, if it marks him off from every other class of animal whatsoever; if we are prepared to say, as we are, that every animal which is viviparous, and has two hands and two only, is entitled to the name of Man.

This seems the place to consider another objection to which this plan of concise Definition is liable. It has been argued, that a Definition, which does not enumerate all the attributes of a Class, but only such as are assumed to be distinctive, though long accepted and approved, may fail at last, and be convicted of falsehood. A bimanous mammal, it is urged, may hereafter be discovered, which shall be formed, in some respects, on quite a different type from Man, and to which we should refuse the name, though consistency would urge us to grant it. Neither is it sufficient, taking another point of view, to define him as a Rational animal; because, it is said, we should not grant the name of a man to a fish or a quadruped, which was found to possess reason.

We might reply to such instances as these, that Definition is grounded on Classification, which con-

templates only existing things; and that it is hard therefore to object to it, that it neglects the creatures of imagination, and makes no grave provision for non-entities. But this would be only to evade the difficulty. Cases something like the imaginary examples given above, actually occur. Existing systems of Classification are occasionally broken into by apparent anomalies, which are stubborn facts nevertheless, and must, ultimately, have a place found them. The answer which fairly meets the case, will also bring forward another view of our subject.

Definition does not, with whatever it deals, actually give Knowledge. It provides for the distinctness, not the discovery, of Truth. It has no alchemical power of turning dross into gold; but serves as a touch-stone, by applying which to the individual, we may ascertain the extent of our general information on the matter in hand. We shall soon discover this, if we make a few attempts, which are by no means unprofitable as intellectual exercises, at defining. We shall find, that, if we fail, it is often not so much from ignorance of the Conception we wish to define, as from our insufficient acquaintance with the Classes from which we would distinguish it. A man possessing the most thorough acquaintance with the ingredients, and properties, and uses of Coal, could not therefore define it. He might describe it at length, but this, we have seen, would be no logical Definition.

If he attempted to select one or two distinguishing attributes, he would most likely fail in the attempt; because he was ignorant, not of the substance itself, but of the other substances from which it is to be distinguished. To be successful, he must know, not only the mineral in question, but other minerals also, and a science of Mineralogy as well.

As then we can only classify phenomena which we know, so we can only define on the supposition that such Classification is correct, and based on a sufficient observation of phenomena. The Definition of Man can only distinguish him from all other *known* animals, or all other known rational beings. According to the probability that other rational beings, or other animals, in many respects resembling him, have, or have not, escaped our observation, will be the probability that a Definition, which is certainly valid in the existing state of our knowledge, will, or will not, continue valid hereafter.

We are now close upon the great point of difference between the ancient and modern views of Definition. We have seen that it is a consequence of regarding Definition as relative to an Idea, to hold that, though it implies knowledge, it does not give it. He who can define well must be master of his subject: and to one who had not at least a general acquaintance with it, his words would convey no meaning. Only the proficient can give a Definition; only the advanced pupil

can follow it. Suppose, for instance, a hearer to have no system of Classification under which the diamond falls, or a different one from that employed by him who defines it. The Definition will be unmeaning to him in the former case; it will seem inelegant, irregular, or possibly even wrong, in the latter.

This would not be the case, if Definition were, as it was supposed to be, absolute. To define a Conception, would not be in that case to assign it a place in relation to a particular Science, but to state its gradation in the great scale of things. Definition would not appeal to a Classification with which students only were supposed to be acquainted; but would regard all things by the common light of human nature. On this hypothesis, it would be intelligible to one who had no antecedent acquaintance with the subject. Thus Definition was formerly considered as one actual source of knowledge. Fresh information was to be extracted from it by means of the syllogistic apparatus. By its aid, the imperfections of sense were to be remedied, and Science carried beyond the sphere of observation. And hence the importance formerly attached to the rule, which commanded that every Definition should be composed of two parts, each in itself "better known than the thing defined."

There was a very intelligible sense attached to the phrase in question. Those things were better known in themselves, though probably less known

to us, which were more universal. They held a higher place in the deductive scheme, and approached nearer to those summary laws of Nature, on which lower laws were founded. Thus they were more cognisable by reason, just as things less universal were more cognisable by sense. And therefore the rule above given might be put in other words as follows—the Genus and Differentia must each of them be more Universal than the Species to be defined.

This rule is evidently binding in the case of Genus, if, as we have said above, it expresses the attributes common to the group of collateral Classes, of which the Species is one. Nor is it hard to see the reason of Aristotle and the Schoolmen after him, for making the same demand with regard to Differentia. They intended, as it has been observed, that the Definition should give knowledge. This it was to do, by enabling the mind to combine two Conceptions, which it had entertained previously, into a new Conception; just as in syllogism from the two premises we draw a conclusion, which while it requires both, is distinct from either. It would not be difficult to shew, that this view assigns a power to the human mind which it does not really possess, of combining its Conceptions according to some certain and invariable law. Two Conceptions may indeed be added mechanically one to another; but we can no more predict, in Metaphysic, what will result

from their intimate union, than we can foretel, in Chemistry, how the appearance and properties of a protoxide will be altered, by its combination with another volume of oxygen. In either case we may make happy guesses, but we have no guide to which we can trust implicitly; nothing beyond that tact in perceiving analogies and so anticipating consequences, which experience develops if it does not give, and the conclusions of which, in their most perfect form, cannot, if unsupported from without, rank very high in the scale of probability.

But, putting considerations of this kind aside, it is clear, that if a Definition is, in accordance with this hypothesis, to give knowledge, it must be made up of Conceptions, each wider than the Class to be defined. For, if either of its parts be only co-extensive with the Class, no new range will be gained by the mind, which must still be fettered by the limits of observation. On this theory, for instance, it would be unsatisfactory to define Man by his having two hands. Whence, it may be asked, has the mind derived this Conception of bimanous? Since nothing except man is two-handed, it can only be from man himself. So the Definition is not really explicative, because, in order to understand it, we must be acquainted with man, who is its subject. We may define him as an animal with two feet and without plumage, and escape this objection. For though no other

animal be both two-footed and destitute of plumage, we may derive each of these notions, animal, biped, and featherless, from other sources than Man.

In modern enquiries, where Definition stands not as the source but as the registry of our knowledge, no such restriction is required. We are content that the Genus shall be often co-extensive with the Species. Unambitious of exercising the dangerous privilege of combining Conceptions independently of experience, we only claim that the Differentia be as clear and as universal as the Class defined, and seek neither greater clearness, nor a wider universality.

We have confined our considerations, hitherto, to purely Logical Definition. We have seen, that, in order to sustain its pretensions at all, it must allow them to be considerably narrowed. In no sufficient sense does it state the nature of the thing defined. It implies no attempt at exhausting the attributes of its subject. This it views, not as it is in itself, but only in its relation to a certain Idea. Neither do all the attributes which can be shown to refer to the Idea enter into the Definition. Those only are there admitted, on which the place of the Conception with reference to the Idea turns—those only, in other words, which enter into the scheme of Classification. Thus it is not quite correct to say, that a Logical Division expresses the analysis of a Conception. It is grounded on such an analysis, but does not wholly express it. We

take an individual, and reject those attributes which belong to it as such. Being thus rid of the Accidents, we have gained the Conception of the Species. Of this, the Attributes divide into those which have direct reference to the Idea under which it falls, as entering into the scheme of Classification, and those which have not. Of these, the former, portioned out into Genus and Differentia, compose the Definition; the latter take their place under the stricter or looser senses of Property.

It would be foreign to our present purpose to speak of Definitions other than Logical. Suffice it to say, that from Logical Definition they derive their name, in virtue of a likeness and analogy more or less cogent. But they are wholly unscientific, and are useful only as suggestive, or as affording raw material, so to speak, for further speculation. Thus Physical Definition is a conjunction of words which has almost, if not quite, disappeared from our ordinary phraseology. It signifies only an enumeration of all the attributes of the Class defined so far as they are known; without any selection, or scientific arrangement, or grouping under an Idea. It is therefore prior to Classification, as Logical Definition is posterior to it; and from its indiscriminate mass the Naturalist selects what is fitted for his purpose. To use a distinction of Lord Bacon's, it belongs, not to Physic, but to Natural History. Thus it

follows the analogy of Logical Definition, in being grounded on an analysis; but here it is the thing which we analyse, and not the Conception.

Nominal Definition has held its place, but by a very doubtful title. Its exact nature, Logical writers find it hard to state. The most consistent view of it is also the simplest, and that which rests on the most ancient authorities. We define a thing nominally, when we show, or rather attempt to show, its nature, by examining the etymological formation of the word by which we commonly express it. This also is evidently named from the analogy of Logical Definition, being founded on an analysis, not, however, of the Conception, but of the Word. Though often highly suggestive, it can seldom be trusted, unless we are prepared to allow, that, in forming compound words, men have always regarded the most fundamental and permanent features of the objects to which they applied them, to the exclusion of those which are fleeting and superficial.

Of all the spurious species of Definition, that which is called Accidental, or, in one word, Description, is at once of most common use, and least nearly related to its Logical prototype. Without any attempt at analysis, it merely takes those attributes of the Class which appear most salient and characteristic, and calls attention to them as marks by which it may be recognised, quite independently of its relation to other Classes.

These few remarks on the secondary kinds of Definition are a digression from our main subject: but they may be useful in showing, that one Species only is recognised by Science; that of this, all others are, more or less, imitations; and that, in every case, Scientific and Logical Definition coincide.

One possible difficulty attendant on the previous views, still remains to be obviated. It may be objected to the practical working of this scheme of Relative Definition, that it reduces all Sciences to a dead level, and destroys their real distinctions as to dignity and importance. Has Man, as such, it may be asked, no Definition? Is it of no consequence, whether we view him as mortal or immortal, in his relation to the animal kingdom, or to the spiritual world? Logic will do little service, if it thus violates Common-sense, and overleaps a difference which we observe in everyday life.

A little care in drawing a necessary distinction will serve to meet this difficulty. Suppose the same thing to be defined in reference to several Ideas. It follows, that each Definition may be equally correct, but not, of course, equally important. As the Ideas themselves rise and fall in dignity, so will the Classifications and Definitions which are founded on them. Thus the value to be attached to the several Definitions will depend, not on the degree of their correctness, (for all may be

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equally correct) but on the comparative prominence of the Ideas—a subject which shall be mentioned, though not discussed, at the conclusion of this Essay.

CHAP. X.

ON THE GRADATIONS OF SCIENCE.

WE will now once more recapitulate the common features which are possessed by all the Sciences. In the first place, each of them is grounded on an Idea. Next, under this Idea is ranked a multitude of Conceptions. Thirdly, these Conceptions have, amongst each other, an Order and Arrangement, in which constant reference is had to the Idea. Fourthly, beside this Order and Arrangement, which either tends to, or amounts to, Classification, there is some aim at, and appearance of, Deductiveness, and consequentiality, wherever formal Deduction, and strict Consequence, are, from the nature of the case, impossible.

Thus much for the common features of Sciences in general. They will be indirectly illustrated yet further in the following remarks, which are intended, however, to answer directly a different purpose, and to mark, not the Similarity, but the Distinction of Sciences; not their Uniformity, but their Gradations.

The highest place in the scale is of course assigned to *Pure Science*. Of this we take Geometry

as the type. Its peculiar and characteristic excellency is, its entire dependence on its Idea.

The Idea, in this case, once given, all the Science necessarily follows. It is the nucleus round which all that is homogeneous with it clusters by a natural law. When once Space is conceived by the mind, mere cogitation, without the aid of experience, would be able to draw from this Idea the Conceptions of Lines, Surfaces, and Solids, and all the various species of these which the Science of Geometry recognises. The principles of Classification, also, are here exemplified. They only escape attracting our attention, by appearing in so natural and obvious a form. It has been said above, that on Classification follows Definition. Here, accordingly, a good Classification lies at the very base of the Science, and a corresponding series of accurate Definitions follows it. We begin Pure Science by defining. In other words, we commence by positing our Species, and stating their Genus and Difference. That result, at which, as we shall see presently, lower forms of Science aim, is attained before the main labour of pure Science begins.

Being thus furnished with an Idea, and the subordinate Conceptions, and the system of Classification, we apply ourselves to our new work, that of drawing Consequences. And the consequentiality is here as perfect as all that has preceded it. There is no gap between our Data

and our ultimate conclusions. The necessary laws of inference, when applied to the Definitions, Axioms, and Postulates, enable us to invest our Species with Properties before unknown. Squares, Triangles, Circles, become no clearer as we advance; for they were accurately defined before we began our researches. But they do become fuller Conceptions, as they are associated in our minds with fresh Attributes. And all these Attributes are Properties: they are proved to be inseparably connected with the several Classes, though not taken into consideration in forming them. In this most perfect sphere of speculation, Accidents have no place.

Such then are the distinctive excellencies of Pure Science. It possesses the highest Unity, being simply the development of a single Idea. It begins with a perfect Classification, and following on this, with accurate and perfect Definitions. But these merits are comparatively eclipsed by its most distinguishing excellency, an exact and perfect Consequentiality. From first to last, it flows in one direction, from the Idea downwards. There is no appeal to Experience,—no desire of confirmation from without,—no endeavour, when the fact has been derived from one quarter, to find the reason in another. Every link of the chain of knowledge holds: and, wherever the process stops short, it is, as far as it goes, perfect; having perhaps an unfinished air, but still enduring even in this

intermediate form, and capable of addition without alteration.

Next in place of dignity to Pure Science come the *Applied Sciences*. Of these, we have before taken Mechanics as an example. Here, too, we have an Idea, and a number of conclusions flowing from certain data according to a necessary consequence. But the Applied Sciences are inferior to the preceding Class in one important particular. They have not the same absolute Unity. Their main Principles, though closely connected with the Idea, need not be deductions from it, mere phases and aspects in which it exhibits itself anew. They often need independent proof, and rest upon the testimony of Experience. Thought alone could not have extracted them from the Idea. No one, by only pondering the nature of Force, could arrive at the knowledge of the laws of Motion. Thus there is an interval, so to speak, in the Applied Sciences, between the Idea and the subordinate Principles, which excludes them from perfect Unity, lowers the student from the sphere of pure Abstraction, brings him to the border-land of the Intellectual and Sensible, and introduces the contrast, though not in its hardest outline, between Form and Matter. Thus the province of Reason is somewhat narrowed, and that of Experience expands.

In this respect their practical application answers to their theory. Though, the further they are

pressed, the more power they display; though they admit, in practice, of a minute elaboration to an extent which beforehand would be simply incredible; though they transcend the limits of observation, and become prophetic at the time, to derive afterwards fresh credit from the verification of their predictions; yet one important part of their office is to account for the past. This is seldom the case with Pure Science. That, for the most part, gives at once the fact and the reason. It does not usually derive the knowledge of a truth from some extraneous source, and then account for it in virtue of certain known laws; but, from these laws, reaches out to new propositions, which, but for it, would have remained unknown. Not so the Applied Sciences, which have generally, in all their provinces, to account for facts which are known from Observation and other independent sources, before they are trusted in the field where Reason supersedes Sense, and takes a free flight beyond the regions of Experiment.

But if the Applied Sciences be thus deficient in Unity, a more serious objection lies against the next Class of Sciences, which we call *Classificatory*. Of these, we may take Botany as an example. They have indeed a sufficiently perfect Unity of Idea. Every fact of Botany, for instance, bears naturally on the Idea of Vegetable Life. The mind is never in suspense, never seems wandering from its subject. All the Conceptions group themselves,

whether readily or not, at least with obvious reference to a single purpose. And therefore the Classificatory Sciences exhibit, in their fullest perfection, the system of Classification, and the practical use of the Predicables. Accidents are not excluded from their cognisance, as in the higher forms of Science. Varieties, for instance, or those modifications of the species which are not necessarily permanent, though they seem practically to be so; the habitat of a plant, or its œconomic uses, though confessedly Accidents, find their place in a Botanical treatise. Definition also is perfectly exhibited, though its position here is very different from that which it occupies in Pure Science. There, as we have seen, the Species are first defined, and then certain Attributes, which we at once recognise as Properties, either in the stricter or looser sense of the term, are affixed to them by the process of inference. In the Classificatory Sciences we begin at the other extreme. A mass of Attributes is placed before us; we have to arrange them in such a manner, as to determine what constitute the Class (in other words, enter into its Definition), and what do not. And those Attributes which fall under the latter head, according as they are permanent or not, are distributed into the remaining classes of Property and Accident.

But the great deficiency of these Sciences, in spite of their combining correct Classification and

Division with a sufficient Unity, lies in their lack of Consequentiality. Let the facts be arranged in the best possible manner; the principle of cohesion is still wanted. The facts must be taken on trust; they bear little or no evidence to their own truth; they resemble, when combined, some piece of Mosaic work, which must be held together by a frame, or it would fall to pieces; they require the check of evidence, and the support of observation. In Geometry, no position of Euclid can be ignored or doubted by one who has paid due attention to the treatise, without his exposing himself to the charge of folly or wilfulness. In the Applied Sciences, when certain premises are granted, all doubt as to the sequel is put out of the question. But in Mineralogy or Botany, each separate assertion admits of dispute; the proof of any one will not serve to establish any other: all the internal evidence of the truth of a system lies in the natural air of its details, and the consistency of its general features.

Is there then, it may be asked, no Consequentiality in the Classificatory Sciences? May we not say here, as well as in Mathematics, that the Properties are traceable to the nature of the Species, as effect to cause? When, for instance, monocotyledonous plants are found to be endogens, while dicotyledonous plants are exogens, may we not say that these modes of growth are consequences, respectively, of the single and double cotyledon?

We answer, in the first place, that while it would be rash to deny all consequentiality to the Classificatory Sciences, we may safely assert, that, when compared to the previous kinds of Sciences, they prove in this respect greatly deficient. It is certain that we have here no such knowledge of the laws of consequence as to enable us to predict results. No one could have told *a priori*, that monocotyledonous plants are endogens; no one can venture safely on like predictions hereafter. All attempts at anticipation on such subjects must depend on Analogies, which often fail, and can never be more than probable evidence. So that, at best, Consequentiality shows itself here in its lowest form. We must be abundantly content, if, having traced our facts first, we can discover the reasons afterwards.

We should further observe, that it is by no means the same thing to be sure that consequence exists, that two phenomena are connected as cause and effect: and to be able to investigate the stages of the consequence, to have the history, so to speak, of the causality. One phenomenon may invariably, so far as our observation goes, follow and attend upon another; and yet we may perceive such a gap in the nature of things between them, as may serve to convince us that there must be some remote law, as yet perhaps undiscovered, on which their connection depends. To take our former example: thus much seems clear, that

endogenous growth is the consequence of the presence of but one cotyledon: but the fact of the consequence does not explain its mystery; its law is still unknown. Admitting that the phenomena do accompany each other, we enquire *why*; and at present, in vain.

We may now briefly state the sum of the previous remarks on the gradations of Science. Pure Science, we have seen, is the type which unites perfections elsewhere separate, and in which Unity of structure and complete Classification meet with perfect Consequence. In the Applied Sciences, the Consequence, when the premises are once given, may be as perfect, but the Unity is of a lower kind, and depends less entirely on the Idea. The Classificatory Sciences have a Unity nearly as perfect as that of Pure Science, with a Classification as perfect, and of yet wider range. But here the parts are bound together by a loose tie, and the scientific mind regrets the absence of Consequentiality.

One observation remains to be made at this part of our subject. Sciences are sometimes complicated. Observation and Reason go together to make up the whole. An inductive process, which is mainly one of Classification, is to be gone through before the premises are gained from which the deduction begins. And this process is not always, in the less exact Sciences, considered as antecedent to the Science, but sometimes as a part of it. Thus in

Harmonics the relation of the number of vibrations to sound, though a matter of experiment, is recognised as part of the Science; though it serves mainly as the preliminary to other parts, which deduce hence the laws of harmony and discord as dependent on number.

Sciences like these take their place according to their predominant element. We must analyse them, and rank them higher or lower, as the Empirical or the Rational preponderates.

There is another Class of Compound Sciences, such as Geology, and, especially of late, Astronomy, which assume another form. First of all, a certain set of phenomena are collected and arranged: a number of truths are gained by inference, observation, or both. So far the ordinary procedure of Science is observed. We state, after due consideration, what is true at present. But another Class of questions soon comes in. We ask, what conditions of things in past time these present truths presuppose. These are some of the most interesting problems connected with Science. Who is not anxious to know, what we can lawfully infer as to the state of the earth in past ages, from the present facts of its stratification and organic remains;—how far celestial phenomena make the nebular hypothesis probable;—and whether the optical properties of the diamond oblige us to assign it a vegetable origin?

In cases of this kind, it is with the present phe-

nomena that Science, in the strict sense, deals. In attaining or arranging these, it occupies itself. The further queries resulting hence, in deciding which we must infer what has been formerly from what is now, do not belong properly to Scientific Method. There is here no subordination and arrangement, but only a question, as to the practical connection of fact with fact. We can only ask—does the existing state of things necessitate the belief, that another economy, differing in certain given respects, existed at a certain given time? Our facts are as so many witnesses in a court of justice. To decide whether they prove their point, appertains not to Scientific Method, but to the ordinary laws of Evidence.

CHAP. XI.

ON METHOD IN ART.

WE should wander far from the direct line of our enquiry, were we to allow ourselves to enter fully on the place of Method in Art. It would be no trifling undertaking to attempt an Analysis of the rapid glance of Invention, or the cooler exertion of the critical faculty. The comparative inexactness of Method in this province gives a wider scope for speculation concerning it. The two great divisions of Art, the mechanical and the æsthetical, might put in separate claims for discussion. We should have to assign due place and proportion to the skill which adapts means to ends, the fine taste which discriminates results, the broad general theories of beauty and fitness, which the Artist is supposed, often unconsciously, to obey. We might wander freely on the enchanted ground: but should soon find ourselves far from the dominion of Logic.

Our task, with regard both to Art, and to Morality, which in this point of view is closely connected with it, is of a much simpler nature. We are to avoid entering unnecessarily on their

peculiarities, and content ourselves with considering those features in which their procedure is identical with, or stands in intimate relation to, the Logical Method of Science.

Art, then, like Science, has to consider the relations of certain Conceptions to an Idea. There can be no true Art when an Idea is altogether absent. There may be much empirical skill, great accuracy in imitation, close observation of detail, but no genius, invention, or originality.

Yet, on the other hand, there seems to be truth in the position, that Art does not deal with Ideas. Its work is the production of actual individual Things. It seems to wander beyond its province, and confound itself as the case may be, with Mechanics, or Æsthetics, or some narrower Science, when it quits individuals, and meddles with principles at all.

These two sides of truth may thus be reconciled. Art has, indeed, to do with individual things. But each of these will fall not under one Idea only, but under several, will bear a definite relation to them, and be capable of receiving illustration from them. In other words, the subject of a single Art lies within the sphere of several Sciences. And it cannot be expedient to neglect the light which methodized knowledge may thus cast upon it. These Sciences can be made practically useful, if knowledge is really power. And how are they to be brought to bear? Not surely in an irregular

and desultory manner. This would be a contradiction of their nature. The several Sciences, which claim so much order and arrangement in their respective provinces, cannot be in a state of anarchy among themselves. One Science will be dominant above the rest; and the Idea of that Science will be the Idea of the Art.

Must, then, the Idea on which an Art is founded be necessarily a Scientific Idea? It would seem not. After all the attention that has been devoted to the Philosophy of Fine Arts, a real Science of *Æsthetic* has never been attained. We have not been able to state satisfactorily in a deductive form the nature of the Beautiful. But, though the Science has been absent, the Art has gone on. It is sufficient that there is no antecedent impossibility of such an expansion of the *Æsthetical* Idea. Meanwhile, Art has lost little of its dignity and nothing of its unity; though it has continued deficient in certainty. Comparatively little faith has been shown in general rules, and more reliance necessarily placed in the individual sense of the Beautiful.

Art, then, being like Science, conversant both with Conceptions and Ideas, it is natural to enquire, to what kind of Science it is most closely analogous. In its perfect form it approaches closely to the Applied Sciences. To the type of Pure Science it cannot at all approximate. Its constant appeal to the outward world and experience, its endeavours

to meet particular wants and gratify particular senses, separate it clearly from the range of *a priori* truth. The empirical element, though not always equally prominent, must be always present. And if we can trace in Art, as we can in Applied Science, not only the subordination of the Conceptions to the Idea, but the reason of that subordination, our approximation to scientific consistency is so much the closer. Yet such systematic completeness is quite unnecessary for practical purposes. And it is only when we can bring the laws of number to bear on our subject, that it can be really obtained. In other cases, we may well rest content with the same comparatively vague notions of consequence which we have observed to exist in the Classificatory Sciences. It will suffice us to infer from the unity of sequence that it takes place in virtue of a law of causation, without pretending to discover how that law operates.

We shall soon have occasion, in treating of Analysis and Synthesis, to mention some points in which Art and Science are differently related to Logic. Meanwhile, there seems a necessity for a few remarks on the relation, with regard to Method, of Morality to Science.

CHAP. XII.

ON METHOD IN MORALITY.

MORALITY may stand to Method in two different relations, between which it is important for our present purpose to distinguish. In the first place, it may be viewed as a Science—that great Science of Human Conduct in general, which enters into the springs of action, and the intellect and feelings so far as they concern action. In this sense, it forms the basis of Politics and Rhetoric, and to some extent even of Poetry and the Fine Arts, as well as of Morality in that second sense, which shall be mentioned presently. But, important though it be, it needs no separate discussion of its Method, being in fact a Classificatory Science; more elevated in its character indeed than any other of its Class, and, as it deals with internal rather than external phenomena, proportionably more difficult of attainment; but still, conforming to the same laws, and arriving at its results by a similar process. Morality, in its second and lower aspect, is subject to the same conditions of Logical Method as Art. It might indeed be defined as the Art of Right Action, did not common usage restrict Art

to a narrower range, and assign to it some definite end, short of the perfection of human conduct in general. Assuming then that its Method is broadly the same as that of other Arts, we will mention a few peculiarities, which are intimately connected with its nature.

It is, then, closely allied to those Arts, which are grounded on some elevated Idea, not as yet made the subject of a perfect Science. There is no commonly recognised and admitted Science of Goodness; no system of arranging those phenomena of human conduct which we call Good, on which Philosophers in general agree. At such a system we have seen many elaborate attempts, but none successful. Thus the Art of Morality is dignified rather than perfect; and, where it most succeeds in accuracy of detail and practical cogency, is deficient in theoretic dependence on its first principles. We allow the connection of the phenomena in fact, rather than perceive the reason. In this respect it is closely analogous to the Fine Arts. Nor can we be surprised at any extent to which the parallelism runs, when we remember the close connection between the Ideas of Goodness and Beauty. But this Art, however complete, could scarcely be of great practical utility to those who would become good. Its advantageous exercise implies the full recognition of the Idea of Goodness. And, in such recognition, Moral Excellence is presupposed. Again, we are

incapable of using an Art aright, unless we are familiar, not only with its rules, but with the purposes for which it is employed. But the Art of Morality aims at producing good action; and good action, philosophically viewed, is an internal phenomenon, which can be known only by our own experience, and not by observation of others. Therefore to apply the Moral Art advantageously, we must be good already.

This seems a paradox, but it is not far from the truth. The Art of Morality is practically identical with that of Education. He who is acquainted with it applies it not to his own case, but to that of others. They are, if possible, to benefit by his experience; and attain the same end, but by a shorter and more direct process.

There is the more occasion for this remark, because the misapplication of the Art in question involves considerable danger. The object of its rules is to enable those, for whose benefit they are meant, to realise more vividly the Moral Idea in general, and to attain clearer Moral perceptions in detail. But the knowledge of a rule which they think they can obey without hesitation and doubt, may lead them to neglect the exercise of those perceptive and reflective powers, by which alone they can really apprehend the Moral Conceptions, and combine them under the Idea. In a case of this nature, the endeavour after systematic cultivation may thwart the very tendencies which it

seemed likely to forward. Thus a loose and imperfect casuistry, or any casuistry out of its place, does harm. In the former case, it degrades the Moral sense which adapts itself to its standard; in the latter case, it hinders its operation by seeming to render it unnecessary. We should have little hope of excellence in a painter, who followed some general law of Beauty which he thought he had discovered, in spite of the evidence of his eye given to the contrary side. In like manner we cannot hold him to be really good, who sacrifices to some formula of Right and Wrong which he thinks to contain the truth, the unbiassed verdict of a reflective and uncorrupted Conscience.

What, then, are the points of resemblance and difference, with regard to Method, between Art and Morality on the one hand, and Science on the other? We have, it has been seen, in each an Idea, and Conceptions ranged under it. We have in each as much Subordination and Consequentiality as the nature of the subject admits. But in purpose and practical application, as well as in form, there is a strong contrast between them. All Science, as such, aims mainly at the illustration or expansion of its original Idea. In this, Deductive and Inductive Sciences agree. Thus far, the same impression is made by the successive Deductions which follow in Geometry from the Idea of Space, and the multiplied phenomena

which we group under the Idea of Life in Botany or Zoology. The central unity is brought more vividly before the mind by being traced and followed through the plurality of detail.

Not so with Art. Its every-day work of production keeps it from this continual tendency towards an ideal centre. When the Idea can be traced in the lower mechanical arts, it seems often to be merely instrumental, and to discharge the office, so to speak, of an intellectual fulcrum, which may enable us to bring our Conceptions to bear the better upon practice. The Critic may trace the Idea in the Conception; the Artist is only careful to illustrate the Conception by the Idea. This seems to be true even in the Fine Arts and in Morals. How little need the Artist be conscious of that theory of Beauty, which, were he a philosopher, he would in strict consistency adopt. And how wholly ignorant are many who act in the spirit of the institutions under which they live, or are pledged to the moral precepts of the school in which they are educated, of the really distinctive features of the system, which they every day exhibit with sufficient success in practice!

One other point of difference, and that not unimportant, between the Method of Art and Science, remains to be mentioned. It will find its place in the following remarks on the nature and application of Analysis and Synthesis.

CHAP. XIII.

ON ANALYSIS AND SYNTHESIS.

WE have hitherto considered Science and Art from one point of view only. The question before us has been, what form they assume, when they have attained comparative perfection. The shape which they take in earlier stages, the process they go through on their way to a fuller development, we have scarcely touched upon. Some remarks on this point will bring us well nigh to the close of our subject.

The method of attainment is indeed far from prominent in Science. The reason of this is found in the very meaning of the term. We cannot attach the name of Science to any knowledge which is confessedly very imperfect both in form and matter, deficient in its parts, and unshapely in its proportions. The task of elaborating it is incumbent on a very few. Most men receive it from some higher mind, which, in constructing it, registered only its successes and results; not its doubts, much less its failures. We see only the

finished work, not the rough side of the tapestry. And thus, though Science of course implies a previous process, it does not suggest it to the common observer, or call his attention to it.

It is very different with Art, which, as we have seen, seldom, if ever, attains this pitch of systematic perfection. At best, it is struggling towards the type, itself not the highest, of Applied Science. Here we are obliged to contemplate tendencies as well as results, the nature and direction of mental effort, as distinct from that which it effects. The more so, because Art cannot, like Science, afford *to wait*, in order to gain system. It is needed as bearing directly on the actual work of Life. It is a tool for certain purposes, which must be used when its purposes require. If it be not perfect, we must take it as we find it. We gladly use the indifferent Physician who is at hand, while we dispatch the messenger to summon some more skilful leech from a distance. In Art then, the Method of discovery is almost always as prominent as that of perfect statement; and often much more so.

It is this which is commonly expressed by the formula, that Science is Synthetical and Art Analytical,—a formula which, in its bearings on our subject, will require some explanation. And the first step toward this is, to assign to the terms, Analysis and Synthesis, a definite and accurate meaning.

One ordinary manner of explaining them,

though true on the whole, is not satisfactory. According to this view, all reasoning from part to whole, is Synthesis; all reasoning from whole to part, is Analysis. And this explanation tallies sufficiently well with the common use of the terms. Its imperfection is, that, practically, it is apt to become indefinite. Our notions of Whole and Part are liable to vary; Genus is a whole in one received sense, and Species in another. Thus the distinction between Analysis and Synthesis is made to rest on the uncertain foundation of a shifting meaning. But it seems unwise to leave the force of words so commonly received, liable to a sudden inversion, and to oblige them to share the ambiguity of other terms, with which they have not any obvious connection.

Perhaps we shall find here our best guide to the strict truth in following a Metaphor. For Metaphors we must use, in describing intellectual operations. Our only choice lies between using them in an ignorant and unguarded, and a conscious and careful, manner. What then is the source of the figure by which Analysis and Synthesis are applied to acts of the mind? If we regarded the Present only, we should be apt to answer, from the Science of Chemistry. But the history of the terms obliges us to look for their origin further back, in the language of the Ancient Mathematics.

Analysis, according to the old Mathematicians,

was the exact reverse of Synthesis, to which it was meant to minister. It was the indirect Method by which a knowledge of the direct process of proof was gained. Supposing our object to be, to establish the truth of a certain theorem, or to discover the manner of solving a problem; we begin according to the Analytical Method, by assuming that the theorem is true, or the problem possible of solution. Without this primary assumption, the Analysis could not proceed. But, this being granted, the question follows—what other suppositions are involved in supposing this theorem to be true, or this problem to be possible? In the answer to this question the Analytical process lies. We regard the assumption we have made as implying certain prior assumptions. These are again perceived to depend on certain more elementary positions. And so we trace the chain of consequence backward, till we arrive at those data which the Science with which we are at present concerned presupposes as its foundation. The Analysis is then complete, and the Synthesis forthwith begins.

We have here supposed the Analytical process to terminate in success. This of course need not happen. Our original assumption may have been wrong. Or, if not absolutely and certainly false, it may be wholly incapable of being established by the aid of the Science which we have endeavoured

to bring to bear upon it. In the former case, if we proceed far enough, the Analysis will suddenly be brought to a stand. We shall find ourselves involved in the contradiction of some axiom or other fundamental position of the Science we have been employing. In the latter case, the process may be continued, till we arrive at certain positions, of which a further Analysis is impossible; and these will prove not to be data of the Science with which we are dealing. They may be very possibly Propositions the truth or falsehood of which we may not be able to ascertain; and our investigation will then have arrived at no satisfactory termination.

But, supposing the Analysis to be successful, the Synthesis follows as a matter of course. The connection between our assumption and the data of the Science holds; but it is viewed from the contrary extreme. The same truth is now built on a sure foundation, which before was poised for the time, so to speak, in a vacuum. The same steps are taken forward in certainty, which were taken backward in doubt. And thus the whole field which we have traversed in enquiry, we traverse again in proof.

We can now see the especial propriety of taking our explanation of Analysis from this ancient source, rather than from more modern quarters. For it enables us to regard pure Science as supplying the perfect type of Analysis, as well as

of Synthesis. Its hypothetical character, moreover, is thus most strongly brought before us. Whenever we are prepared ultimately to rest the proof of our position on pure Deduction, it appears that no Induction is necessary before making the assumption which the Analysis presupposes. Facts may suggest this assumption, but we do not expect them to prove it. If it be based at last on any other evidence than that of the Deductive process itself, it can only be in a secondary sense a Deductive conclusion. It is not pure Science, but Science in a lower form, which accounts for facts which are known to be true already on evidence other than its own.

Thus we are led to observe, that the Analytical process is hypothetical, exactly in the same proportion as the corresponding Synthetical process is certain and complete in itself. It was in all probability at first an unproved assumption on the part of Pythagoras, that the square of the hypotenuse of a right-angled triangle is equal to the square of the two remaining sides. He had seen this equality, we may imagine, in a single instance of a right-angled triangle, and supposed that it applied to all. When the Analysis consequent on this assumption was attempted, the truth of the Proposition remained doubtful, till every link between the first principles of Geometry and the wished-for result was obtained. But, this chain once formed, the case was altered. Each step

was certain in itself, and a sure basis for what followed. Every intermediate position between the data and the conclusion, as well as the conclusion itself, assumed, so to speak, a new Modality; and from being doubtful and contingent, became a necessary truth.

In the Applied Sciences, as we descend lower, the Analytical process becomes less perfect. Here we demand greater evidence before we make our necessary assumption. For the most part indeed, though not always, we require proof of it as a matter of fact. The occurrence of any apparently exceptional phenomenon does not at once set us speculating as a matter of course about its causes. We rather distrust appearances, and, if experiment can give us information on the subject, have recourse to it that we may learn whether the seeming exception is only a mistake of our own. Or, if it lie beyond the province of experiment, we generally wait till time gives fresh opportunities of observation, and so enables us to form a more perfect judgment. The many new phenomena of light, for instance, which were discovered by chance, were carefully tested before philosophers endeavoured to account for them. Here then, as the Synthesis is of a less scientific character, the corresponding Analysis is of a lower order also. It is no longer the procedure from an uncertainty to a certainty, but the procedure from one certainty, through a series of uncertainties, to another and a

prior certainty. While the Synthesis, in like manner, only gives us, for the most part, the connection between known laws and certain previously known facts, without so often enabling us to predict facts in virtue of their dependence on laws.

It was before observed, that the Consequentiality, which in some sense is present in all Sciences, appears in mere Classificatory Science in a very imperfect degree, being traceable, indeed, only by the aid of probabilities and general analogy. We will further remark, that they exhibit Analysis in a like shadowy manner. Their object is, to arrange certain phenomena under an Idea. This is effected by means of intermediate generalisations, which we interpose in order between the Idea and the phenomena according to their degree of Universality. But these generalisations are lawful, only so far as they tally with the actual facts of Nature. Our Classes must be such as she, by the regular distribution of their Attributes, shows that she recognises. There is in their connection with each other no definite Consequentiality, which warrants us in leaving any step for the time unverified, in the confidence that it will receive at last sufficient confirmation by being referred to some higher truth as its authority. Each separate step must be established by a separate observation. Thus our Analysis becomes the faintest image of the true Analytical process. We do not doubt the certainty, either of the Idea, or of the facts, or of

the intermediate generalisations. All that we *can* doubt, is their admitting of arrangement in a complete and orderly series: and it is this only, that the Analysis enables us to ascertain. Within this comparatively narrow province, it still continues highly useful. We have much more facility in beginning from facts, and widening our Classes as we ascend, than in thinking according to the Synthetical Method, and narrowing our Classes in regular gradation from the Idea.

It remains to mention the manner in which Art avails itself of Analysis. The Method of Art, it will be remembered, approximates to the type of Applied Science. Analysis, then, will hold, theoretically, a similar position in each; though the practical nature of Art has some effect upon its prominence and importance.

Conscious Analysis, indeed, does not seem very common in the Fine Arts. The Critic by his researches often shows that principles are really involved in the works of an artist, which the artist himself has probably never realised in their abstract form. He exemplifies the laws of Science, not in consequence of any intentional study of them, but in virtue of that taste, that perception of beauty in the concrete, which is developed by increased observation, and the careful scrutiny of particulars.

Perhaps in this field the most common use of Analysis is in investigating the cause of defects.

Something offends, we know not why. In the endeavour to refer it back to first principles, we shall discover that some rule has been transgressed, some harmony violated, some canon of consistency broken. Thus very early attempts at Art often fail at the first touch of Analysis; they are defective in consistency; though the parts may be right in themselves, on no possible hypothesis could the whole be true. The same reason is fatal to the attempt of a Chinese artist to depict all six sides of an interior at once; and to the conventional Egyptian representation of a man, in which the head, body, and lower members are depicted in three incompatible positions; and to the head of Minerva on the archaic coins of Athens, in which the full eye, which figures appropriately in the front-face, is transferred without modification to the profile.

In the earlier stages of the Fine Arts, this seems to be the only use of Analysis. Even in their most flourishing state there seems little of that doubt and indecision which the Analytical process implies. Great works are owing to the magic of Genius, and not to any formal process of thought. But when invention waxes cold, and thought turns less readily to the aspirations of the present than to the glories of the past, then Analysis steps in. It gives rules according to which Art has unconsciously produced certain effects, with a view to their reproduction; and these rules will fall under

the Idea, so far as the nature of the case admits, according to the ordinary Method of Science.

It has been before observed, that the Fine Arts, in the absence of a Science of *Æsthetics*, do not admit of a near approach to the Scientific Method. This is not the case with many Mechanical Arts. Some of these afford an opportunity for strict consequence in the formation of the rules, which can be deduced from certain empirical principles by means of the laws of Space and Number. Of this nature are many practical applications of the laws of Hydraulics, and Pneumatics, and Projectiles. Here the Synthetical arrangement is more than a form: and the Method of Art, by coinciding with its type, loses its individuality, and melts into that of Applied Science.

Our mention of Analysis has hitherto been confined to cases, in which it is usual, when the tentative process is complete, to adopt the Synthetical Method of statement, as more scientific and formal. Analysis, however, is not always thus subordinate, as may be shown by any simple instance from the Analytical Mathematics. In a common Algebraic Equation, one or more unknown quantities are posited, and the consequences are traced backward, till those quantities become known. It is not considered necessary to reverse the process, and so to show that the results attained actually fulfil the conditions, which the unknown quantities were assumed to fulfil in the original formula.

Another instance in which Analysis is perfect without any corresponding Synthesis is found in the ordinary process of Deliberation, which has sometimes gained, in consequence, the name of practical Analysis. Those who deliberately desire any object which they have reason to suppose is within their reach, begin, as the first step towards attaining it, to posit it as an end of action. This is, of course, in most cases, a mere assumption. Observation may have shown that the object is attainable by some: but they cannot be sure, without previous consideration of particulars, that it is attainable by them. Nevertheless, they take for the time this doubtful point for granted: and thus make that venture, which all Analysis, in a greater or less degree, requires. The question now becomes, through what means their end is to be attained. Here the Analytical procedure comes in. They consider, what antecedent conditions on their part the attainment of this object requires, and to what conditions these in their turn are subject. Thus they proceed, precisely as in Mathematical Analysis, until they arrive at certain elementary conditions which their own consciousness tells them are within their powers—certain acts of their individual will, and the natural expressions of it in word or deed. The Analysis is perfect when the agent can say—If I will and do this, as I can will and do it, all that I desire will follow. Then Deliberation ceases, and Choice begins. It

seems better to regard the Analytical process in this case as complete in itself, because the subsequent act, although reversing the order of the thought, can scarcely be regarded as answering to it as its Synthesis. It is too different in kind, to take its place in the same Method. Though the desires flow to their end through the channel which Intellect has shaped for them, this does not obliterate the broad differences, which distinguish them from the Intellect itself.

CHAP. XIV.

ON THE CONNECTION OF METHOD WITH FORMAL LOGIC.

PARTICULAR Logical questions have found a place only accidentally in the foregoing pages. We could scarcely descend to detail, in considering the general relation in which, at different times, Logic and Science have been thought to stand to each other. When this disputed point had been discussed in its various phases, it was natural to weigh the subordinate questions which arose from the different views concerning it. And, after having determined what opinions, both on the main subject and on the dependent queries, seemed to have truth on their side, we proceeded to point to Method as a ground of union for Logic and Science; and to Pure Science especially as the common type in which Logical and Scientific Method are each most perfectly exhibited.

Meanwhile, the introduction of even well-known Logical terms, when they were not absolutely necessary, has been purposely avoided. Our object was to show the natural tendency of knowledge to

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fall into a Logical form, and not the power of the human mind to press it by violence into the mould of its technicalities. But, now that our main purpose is fulfilled, it may further, rather than impede, the general impression of these pages, to observe, that the apparatus of Logic not only shows a fitness for exhibiting particular arguments, but discloses differences in its various portions, which indicate a connection with systematic thought and methodical knowledge, when considered not as split up into a multitude of separated arguments, but as consistent wholes. On this subject we will dwell a little in detail.

It is generally allowed by Logicians, that Syllogism, as the formal exhibition of the act of the mind in reasoning, divides itself into three principal heads, namely, the Inductive, the Deductive, and the Hypothetical. Whether these three forms of argument are really collateral Species of a single Genus, or whether the two latter can be reduced, without loss of their dignity or derogation from their utility, to the type of Deductive Syllogism, is a question of considerable interest, but not bearing directly on our present subject. It suffices us, that, for the ordinary purpose of inference, the three modes of arguing are certainly distinct.

And further, it is commonly observed with regard to them, that Deductive Syllogism proceeds from the law downwards, from higher Universals to lower; that Induction, on the other hand, argues from the

fact to the law, from lower Universals to higher; while the Hypothetical Syllogism, ignoring this distinction of law and fact, only implies, that two positions are connected as antecedent and consequent, so that, under the sanction of its own peculiar rules, the denial or assertion of one involves the denial or assertion of the other, without any regard to their relative extent or degree of Universality. And, of these three forms of inference, it is generally allowed, that the Deductive Syllogism, if it be not the most powerful instrument, is at least the most perfect.

It should then surely not pass unobserved, that there is a real correspondence between Deductive Syllogism, which is the type of Logical Inference, and Pure Science, which is the type of Methodical Knowledge. It is well known that Pure Science, if logically analysed, resolves itself into a series of Categorical Syllogisms of the simplest and most perfect form. But taking the subjects of our comparison independently of each other, we trace in them several points of similarity. The highest form of Science, it was before remarked, exhibits both the most complete subordination and the strictest consequence. So it is also in the highest form of inference, the Syllogism in *Barbara*. Here subordination is most fully displayed, for the terms fall at once into their natural order, the *major* including the *middle*, and the *middle* including the *minor*. Thus the terms observe the same grada-

tion in extent, and in their place in the argument. And here also we have the most complete consequentiality; since the conclusion follows, as a necessary and obvious consequence, from the law on which, since the time of Aristotle, the validity of the Syllogism has been held to depend; without any need of alteration in its form, or the check of any derived rule whatsoever.

Again, there is a close practical connection between the Inductive Syllogism and Classificatory Science. They afford, too, their points of theoretical resemblance. Each of them recognises and requires complete subordination. This is implied in the very conception of Classification, and scarcely less so in that of Induction, which depends on the arrangement of facts under a law. This feature it has in common with Deduction, from which however it differs, by inverting the natural order of consequence, and arguing upward instead of downward. Again, it is well known that an Induction, which shall enumerate all the individuals of the Class, is seldom possible, and, when possible, always useless; that we should be content, under certain checks, with a limited number of instances, and, when we are materially right, be willing to confess ourselves formally wrong. Induction then, while it does full justice to subordination, is for two reasons (its formal inversion, and its material imperfection), deficient in Consequentiality; and thus it exhibits just the

same excellency, and the same defect, which characterize the Classificatory Sciences, of which it is the recognised organ.

Lastly, we observed that Analysis in its higher form began with an unproved hypothesis, and then, by a retrogressive course, it felt its way through doubt to certainty. Each step is sure in one sense, uncertain in another. The connection between the several propositions is clear; they all stand firm together, if a basis in fact can be found for that one with which the Analysis concludes. There is, therefore, a strict Consequentiality among them. But, in this merely tentative process, no regard is had to subordination. If we are only assured that one link binds with another, we are careless of the law in virtue of which it binds. This will be brought out in the Synthesis, if we follow up our research with a formal statement. Or, if this theoretically correct shape be unnecessary, the Analysis will stand valid and complete for practical purposes without it. And what is true in this respect of Analysis, is true also of its instrument, the Hypothetical Syllogism. This too has a practical validity, without any reference to the bearing of laws upon facts, or the gradation of Universals, and without reduction to a higher Logical form. In other words, its Consequentiality is valid, though it makes no pretence to Subordination.

The three principal forms of Syllogism, therefore, bear their testimony to the existence of corre-

sponding divisions in Method, and show a peculiar fitness to be its organs. Similar coincidences are traceable in other and minor parts of the Logical apparatus. These, however, it is not now necessary to mention. They will occur naturally to the Student of Logic, though they could not be exhibited in this work without entering on minute technicalities to a degree quite foreign to its purpose.

CONCLUSION.

WE have now concluded, so far as the plan of these pages allows, our consideration of Logical Method. Had they been far more perfect in their design and more exact in their execution, this would not have hindered that unsatisfied feeling, that craving after further Truth, which strengthens with the accession of Knowledge, and is one of the strongest though not of the most pleasant motives for pursuing it.

It has been well said, that the quest, and not the possession, of Knowledge, is the entertainment of the mind. Truth indeed is the one object of our search; but the pleasures of seeking it are present and real; the pleasures of finding it lie in the future, and prove too often imaginary. Even when no failure intervenes between us and our end, the road is almost always longer and more difficult than we expected. We think ourselves near the top of the mountain; and, as we make a vigorous effort to scale what seems its highest crag, perceive that we are but just making our

way over its first shoulder, and that its misty ridges still rise before us in uncertain grandeur, and retreat as we gaze on them.

The reader of these pages cannot be more painfully sensible than their writer, that, after all which has been said of Method, its culminating point is not reached. That highest Unity which would give a meaning to the whole is wanting. Granting that all Knowledge which deserves the name of Science naturally arranges itself, according to certain rules, under definite Ideas, the question yet remains—how are these Ideas themselves arranged? Have not they too their due disposition and gradation? Can we suppose that there is no standard by which we can decide their relative dignity and importance? Centres of unity and sources of order as they are, are they in disorder among themselves?

It is hard to suppose that they are wanting in this arrangement and subordination. And yet how can we discover it? We have surrendered as a vain imagination that Science of Being, of which the Ancients loved to speak. It seems that powerful minds were permitted by Providence to rest on the thought of the absolute Unity of Knowledge, till some parts of Science were so elaborated, that they could bear, in contemplating their separate perfection, to dispense with the thorough consolidation of the whole. We are almost reminded of Alexander's attempt at universal empire, which,

as such, failed; but left, nevertheless, real and permanent power in the hands of his Generals, to be exercised over their fragmentary Kingdoms. Many Sciences we know there can be: we now know, almost with equal certainty, that, while the human mind retains its present constitution, they can never all meet in one.

May there not however be, in the absence of this Ideal Unity, some one Science, to direct the rest, though it does not combine them? As, in Practice, Prudence, which is not an Art, much less the union of all, applies and regulates all those arts which tend, when rightly used, to our common well-being; may there not be in Theory also, some great Science, or something above a Science, to assign our speculations their place, their importance, their proportion, their relative bearing; and make them, if not in fact, at least in tendency, a Whole?

One branch of Study there is, which, in virtue of its very name, points to the Highest of all subjects, which yet, in its application, reaches to the most delicate thoughts and finest sympathies of the heart of man; which tells of Infinity and Eternity, and yet exhibits truths of Infinite and Eternal moment under forms which have reference to Space and Time; which distinguishes between the Permanent and the Fleeting,—the Principle, and the Economies or dispensations which are founded on it; which teaches the importance of

all truths, the supreme necessity of some; to which a Heathen paid involuntary homage, when he gave its name to what he deemed the highest reach of human thought; and which Christians have delighted to honour with the title of the Mother of Sciences.

Much she can teach us directly of the relative importance of truths; much more by the temper of mind and frame of thought she inculcates. She rules over Knowledge, if by no other right, by that of conquest: she subdued it first, to protect it ever after.

And how far is this fair Mother of Sciences like her children? Do the same formal conditions, which bind them, bind her also? If they do not—has she another Method of her own; her own laws of investigation, and standards of truth and falsehood? If they do—how does the nature of the high and mysterious subjects with which she deals affect and modify their application? If, again, she neither conforms to the ordinary rules of speculation, nor has extraordinary canons of her own, how can the body of truth which she presents be fairly studied at all? How can the human mind, prone, not by its perverseness and obliquity, but by a right instinct and a deep principle of nature, to seek for order and system, find its highest occupation in resting on details which may not be combined, statements which may not be compared, examples from which no principles may be extracted,

facts which refuse to incorporate themselves with doctrines?

He will do a good service to Truth, and Christianity, and the Church, who shall face these questions fairly; and, in grave earnest, and after all due preparation, venture, in a strength not his own, to treat of a subject which I have not ventured to handle—the application of Method to THEOLOGY.

THE END.

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